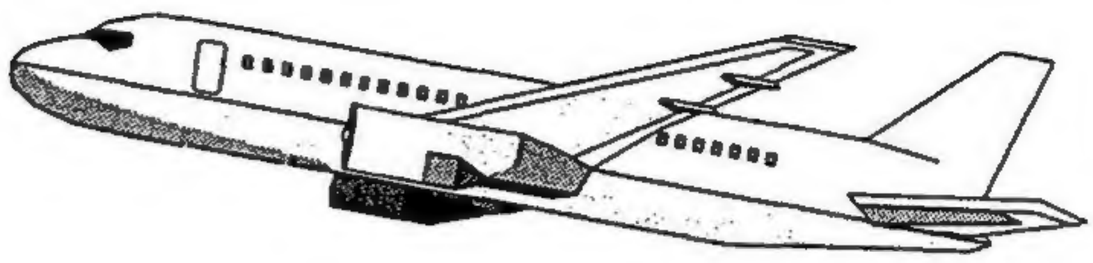

COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

FOR:

898 SERIES CYLINDER & REGULATOR ASSEMBLY

SCOTT AVIATION

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Vendor Code: 53655

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LIST OF EFFECTIVE PAGES

LIST OF EFFECTIVE PAGES (Continued)

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	607/608	June 30/98
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INTRODUCTION

1. Scope

This manual gives the user maintenance, overhaul and service procedures for the 898 Series Cylinder and Regulator Assembly (CRA). This Component Maintenance Manual (CMM) includes different configurations of the 898 Series CRA, including the following:

898-AT0C22	898-AL0C22	898-BT0C22	898-BL0C22
898-AT0C40	898-AL0C40	898-BT0C40	898-BL0C40
898-AT0C50	898-AL0C50	898-BT0C50	898-BL0C50
898-AT0C77	898-AL0C77	898-BT0C77	898-BL0C77
898-AT0C15	898-AL0C15	898-BT0C15	898-BL0C15
898-CT0S22	898-CL0S22	898-DT0S22	898-DL0S22
898-CT0S39	898-CL0S39	898-DT0S39	898-DL0S39
898-CT0S49	898-CL0S49	898-DT0S49	898-DL0S49
898-CT0S66	898-CL0S66	898-DT0S66	898-DL0S66
898-CT0S76	898-CL0S76	898-DT0S76	898-DL0S76
898-CT0S15	898-CL0S15	898-DT0S15	898-DL0S15
898-FT0C22	898-GT0C22	898-HT0C22	898-JT0C22
898-FT0C40	898-GT0C40	898-HT0C40	898-JT0C40
898-FT0C50	898-GT0C50	898-HT0C50	898-JT0C50
898-FT0C77	898-GT0C77	898-HT0C77	898-JT0C77
898-FT0C15	898-GT0C15	898-HT0C15	898-JT0C15
898-KT0C22			
898-KT0C40			
898-KT0C50			
898-KT0C77			
898-KT0C15			

This manual provides the following information:

A. Warnings, Cautions, and Notes to be followed while performing service on the 898 Series CRA.

B. The proper sequence of operations to be performed on the defined equipment.

C. Specifications and a list of tools, equipment and materials for maintenance, check, test and repair of the 898 Series CRA.

2. Warnings, Cautions and Notes

The Warnings, Cautions and Notes call attention to important information.

A. Warnings

Warnings call attention to the use of materials, processes, methods, procedures or limits which must be followed exactly to avoid personal injury or death.

B. Cautions

Cautions call attention to methods and procedures which must be followed to avoid damage to the 898 Series CRA or components.

C. Notes

Notes call attention to methods that make the job easier.

WARNING: ANY SERVICE OR OVERHAUL PERFORMED ON THE 898 SERIES CRA SHALL BE DONE ONLY BY THOSE FACILITIES EXPERIENCED IN, OR BY PERSONNEL KNOWLEDGEABLE IN, AVIATION OXYGEN EQUIPMENT. IF NONE ARE KNOWN, CONTACT SCOTT AVIATION OR ITS DISTRIBUTORS FOR NAMES OF AUTHORIZED SERVICE CENTERS. IMPROPER USE OR IMPROPER MAINTENANCE OF THIS EQUIPMENT MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

ALL PROCEDURES DESCRIBED IN THIS MANUAL MUST BE PERFORMED IN AN AREA FREE OF OIL, GREASE, FLAMMABLE SOLVENTS OR OTHER COMBUSTIBLE MATERIALS. COMBUSTIBLE MATERIALS THAT IGNITE WHEN EXPOSED TO OXYGEN MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. DUST, LINT AND FINE METAL PARTICLES ARE ALSO POTENTIAL COMBUSTIBLES THAT CAN IGNITE, AND RESULT IN EXPLOSION OR FIRE, WHEN EXPOSED TO PRESSURIZED OXYGEN.

REFER TO AND FOLLOW APPLICABLE MANUFACTURER'S OR SUPPLIER'S MATERIAL SAFETY DATA SHEET (MSDS) BEFORE USING PRODUCTS SPECIFIED IN THIS MANUAL OR SERIOUS PERSONAL INJURY MAY OCCUR.

FAILURE TO USE TOOLS THAT ARE FREE FROM CONTAMINATS OR ARE NOT SUITABLE FOR USE ON OXYGEN LIFE SUPPORT EQUIPMENT, MAY RESULT IN FIRE, EXPLOSION OR PERSONAL INJURY DURING SUBSEQUENT USE OF THE 898 SERIES CRA.

3. Product Support Services

Product support services for the 898 Series CRA covered by this document are provided by Scott Aviation. The services include repair and overhaul, replacement parts, and technical documentation.

Scott Aviation
225 Erie Street
Lancaster, New York 14086-9502
U.S.A.

Telephone: 716-683-5100
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Vendor Code: 53655

4. Abbreviations

The following is a list of abbreviations found in this manual.

ABBREV.	DEFINITION OF ITEM	ABBREV.	DEFINITION OF ITEM
ADJ	Adjustment	DOT	Department of Transportation
AR	As Required		
ANPT	Aeronautical National Taper Pipe Thread	EFF	Effectivity
ASSY	Assembly	e.g.	example given
BKDN	Breakdown	°F	Degrees Fahrenheit
		FAR	Federal Aviation Regulation
°C	Degrees Celsius	FED STD	Federal Standard
CAD	Cadmium	Fig or FIG	Figure
cc	cubic centimeter	ft	feet
CFR	Code of Federal Regulations	ft^2	square feet
CGA	Compressed Gas Association	ft^3	cubic feet
CID	Commercial Item Description		
cm	centimeter	gm	grams
cm^2	square centimeter		
CMM	Component Maintenance Manual	hr	hour
CONFIG	Configuration		
CRA	Cylinder and Regulator Assembly	ID	Identification or Inside Diameter
CRES	Corrosion Resistant Steel	in	inch
CYL	Cylinder	in•lb	inch-pound

ABBREV.	DEFINITION OF ITEM	ABBREV.	DEFINITION OF ITEM
IPL	Illustrated Parts List	PARA	Paragraph
		pH	Hydrogen Ion Concentration
kg	kilogram	P/N	Part Number
		psig	pounds per square inch gauge
lbs	pounds	PTFE	polytetraflouroethylene
lpm	liters per minute		
		REG	Regulator
m	meter	REPLD	Replaced
MAX	Maximum	REPLS	Replaces
mg	milligram	RF	Reference
min	minute		
MIN	Minimum	SPN	Scott Part Number
ml	milliliter	SUPSD	Superseded
mm	millimeter	SUPSDS	Supersedes
MPa	MegaPascal		
MSDS	Material Safety Data Sheet	T_e	Transducer Exposure Temperature
		thru	through
N	Newton	TTL	Total
N/A	Not Applicable		
NHA	Next Higher Assembly	UNF	Unified National Fine (Thread)
N•m	Newton-meter	U.S. or US	United States
No. or NO.	Number	USA	United States of America
NP	Not Procurable or Not Provisioned		
NTPD	Normal Temperature and Pressure Dry (760 mm Hg, 70 °F (21 °C))	VDC	Volts Direct Current
		V_o	Allowable Transducer Output Voltage
O_2	Oxygen		
OD	Outside Diameter	W/ or w/	With
OPT	Optional	Wt or wt	Weight
		W/O or w/o	Without

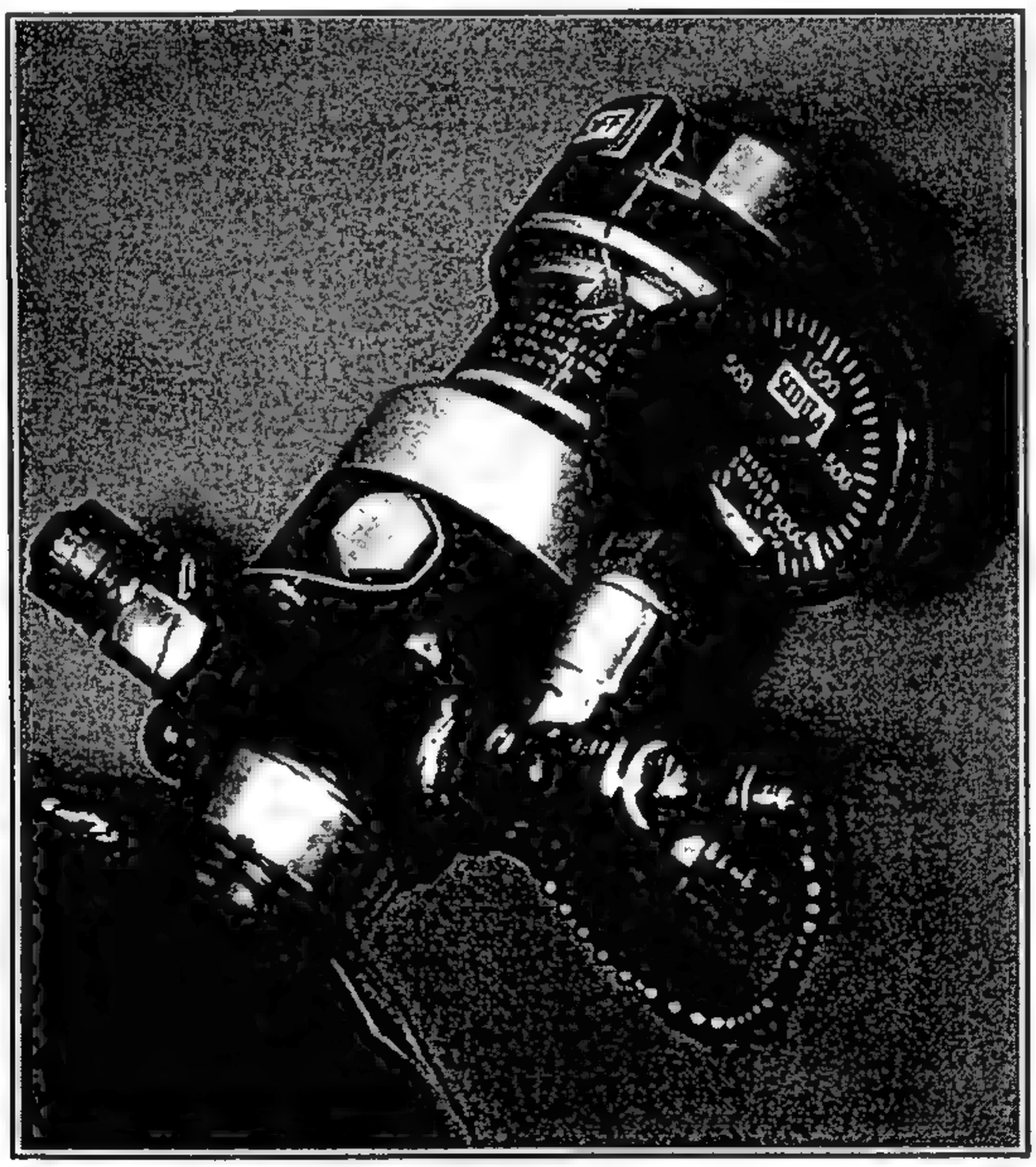
DESCRIPTION AND OPERATION

1. General

This section describes the components and operation of the 898 Cylinder and Regulator Assembly (CRA). Information about part numbers, how to order and the operation of the CRA is also presented in this section.

Each CRA consists of a cylinder on which a manually operated regulator is installed (Refer to Fig. 1). Cylinders are either a composite (fiber wrapped aluminum) or steel construction. The number of CRA's and size of the cylinders selected will be determined by applicable FAR's, number of passengers and the general flight profile of the aircraft.

The regulator reduces high-pressure oxygen, stored in the cylinder, to a lower pressure suitable for use with orifice-type or demand-type mask assemblies. Regulators are either of a toggle type or lever type. Typically, the toggle type regulators are used for applications where the oxygen system remains in the "ON" position while the lever type regulators are attached to a cable system for remote ON/OFF actuation.



898 Series Cylinder and Regulator Assembly
Figure 1

2. Specifications

The Specifications for the 898 Series CRA are shown in Table 1. All thread sizes are in inches.

Table 1
898 Series CRA Specifications

Regulator Assembly	
Type	Manual Actuation (Toggle or Lever Type)
Weight	2.1 - 3.1 lbs (0.95 - 1.4 kg)
Diameter	2.0 in. (5.1 cm)
Length	4.5 in. (11.4 cm)
Inlet Pressure Range	150 - 1850 psig (1.03 - 12.8 MPa)
Outlet Pressure Range	60 - 85 psig (0.41 - 0.59 MPa)
Outlet Flow	5 - 300 lpm NTPD
Lock-Up Pressure (outlet pressure at no output flow)	84 - 90 psig (0.58 - 0.62 MPa)
High Pressure Relief (Burst Disc)	
Steel Cylinder (DOT-3AA-1800 only)	2650 - 2900 psig (18.3 - 20.0 MPa)
Steel Cylinder (DOT-3HT-1850 only)	2500 - 2775 psig (17.2 - 19.1 MPa)
Composite Cylinders	2500 - 2775 psig (17.2 - 19.1 MPa)
Low Pressure Relief	
Cracking Pressure	More Than 90 psig (0.62 MPa)
Resetting Pressure	90 psig (0.62 MPa)
Relief Flow	300 lpm NTPD at 135 psig (0.93 MPa)
Relief Threads (Regulator Body)	0.125 - 27 ANPT
Cylinder Assembly	
Composite Type	
Thread Size	0.750-16UNF-2A
Maximum Gas Storage Pressure	1850 psig (12.8 MPa)
DOT Exemption No.	DOT-E-8162-1850 **or** DOT-E-8391-1850
Steel Type	
Thread Size	1.00-11½ ANPT
Maximum Gas Storage Pressure	3AA Type = 1800 psig (12.4 MPa) or 3HT Type = 1850 psig (12.8 MPa)
DOT Approval No.	3AA Type is DOT-3AA-1800 **or** 3HT Type is DOT-3HT-1850
Envelope Dimensions	See Figures 3 and 4, also Tables 3 and 4

3. Purpose of Equipment

The 898 Series CRA's are self-contained, high pressure fixed oxygen sources that supply reduced pressure aviation grade oxygen (per Military Specification MIL-PRF-27210, Type I) to crew members and passengers.

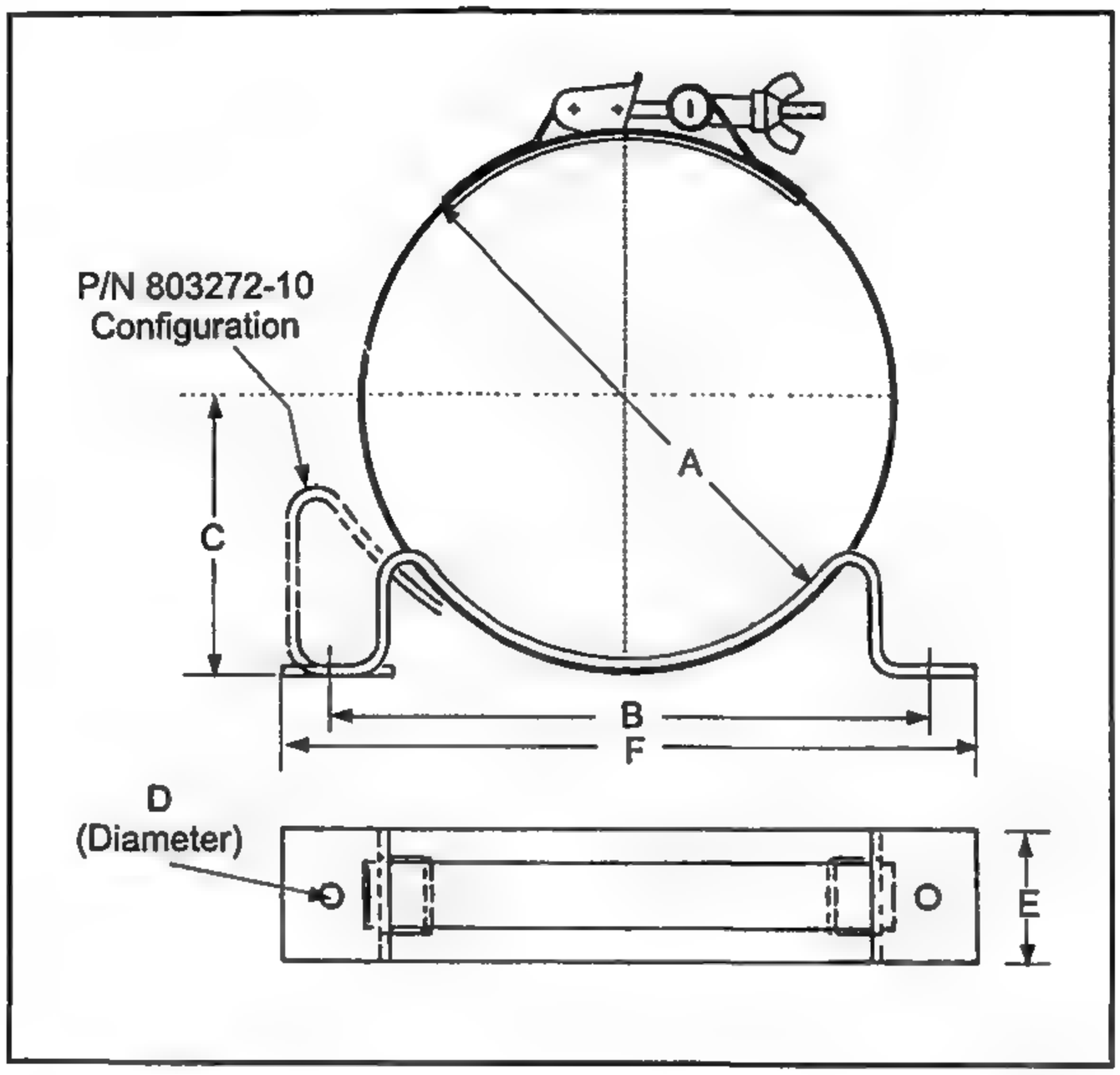
4. Typical Installation

The CRA is typically mounted in the front section of the aircraft using two optional Cylinder-Band Clamp-Bracket Assemblies (Figure 2). The optional Cylinder-Band Clamp-Bracket Assembly used is dependent upon the size of the cylinder assembly.

Refer to the nominal dimensions in Table 2 to determine which Cylinder-Band Clamp-Bracket Assembly P/N to use for each cylinder assembly callout configuration used in the 898 Series CRA.

Table 2
Optinal Cylinder-Band Clamp-Bracket Assembly Information

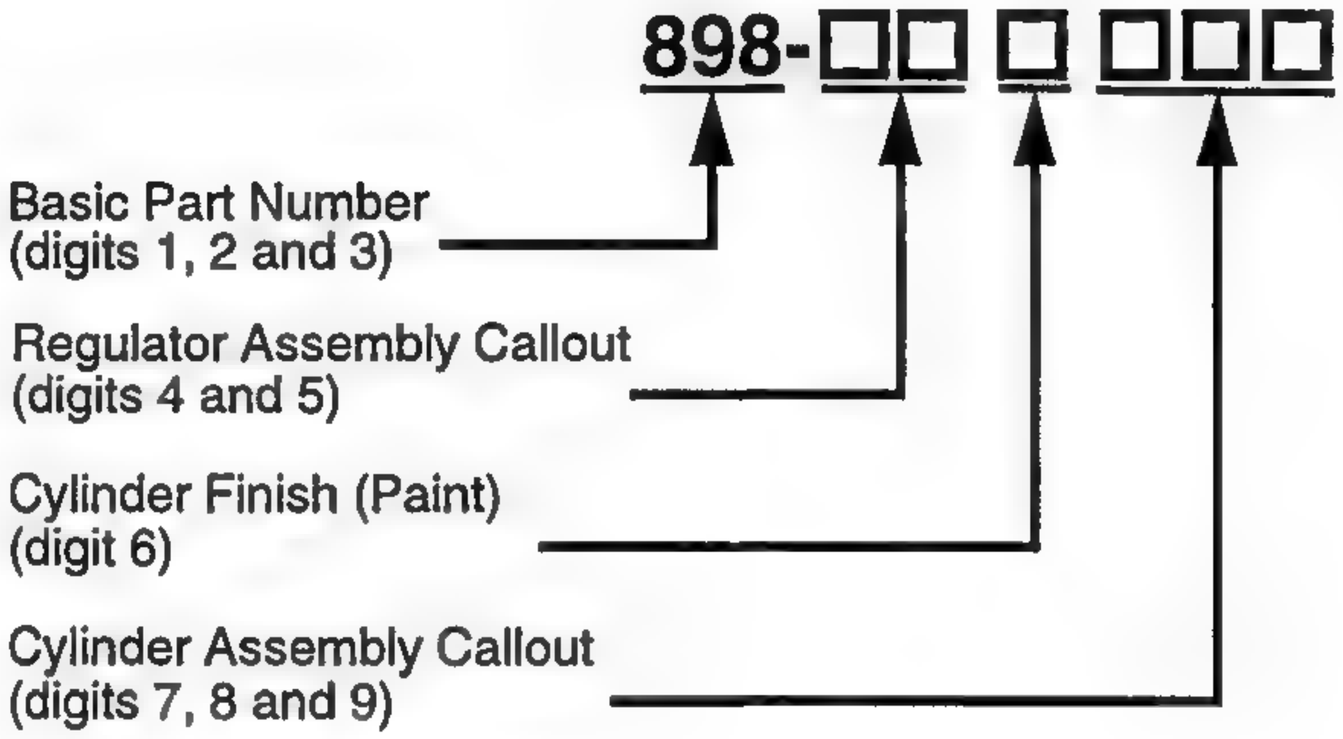
CYLINDER-BAND CLAMP-BRACKET ASSEMBLY P/N	NOMINAL DIMENSIONS (in. (cm)) (SEE FIGURE 2)						CYL ASSY CALLOUT (SEE TABLE 4)
	A	B	C	D	E	F	
800644-00	5.25 (13.34)	4.00 (10.16)	3.04 (7.72)	0.265 (0.673)	1.50 (3.81)	4.76 (12.09)	C22, S22
803272-02	6.75 (17.15)	7.94 (20.17)	3.56 (9.04)	0.199 (0.505)	1.75 (4.45)	9.19 (23.34)	C40, C50, S39, S49
803272-04	7.25 (18.42)	8.50 (21.59)	3.81 (9.68)	0.203 (0.516)	1.75 (4.45)	9.75 (24.77)	S66, S76
803272-05	7.75 (19.69)	7.94 (20.17)	3.81 (9.68)	0.203 (0.516)	1.75 (4.45)	9.20 (23.37)	C77
803272-06	7.75 (19.69)	8.50 (21.59)	3.81 (9.68)	0.203 (0.516)	1.75 (4.45)	9.75 (24.77)	C77
803272-08	9.25 (23.50)	7.94 (20.17)	5.00 (12.70)	0.203 (0.516)	1.75 (4.45)	9.20 (23.37)	C15, S15
803272-09	9.25 (23.50)	8.88 (22.56)	5.00 (12.70)	0.203 (0.516)	1.75 (4.45)	10.12 (25.70)	C15, S15
803272-10	9.25 (23.50)	7.25 (18.42)	4.68 (11.89)	0.265 (0.673)	1.75 (4.45)	9.00 (22.86)	C15, S15



Optional Cylinder-Band Clamp-Bracket Assembly
Figure 2

5. Part Number Identification

Each CRA part number contains 9 digits (excluding hyphens), made of four sections, as described below.



6. Part Number Guidelines

Given below are guidelines for determining the part number of an 898 Series CRA.

A. The Regulator Assembly Callout specifies style of regulator (toggle-operated or lever-operated) and the cylinder type it mounts to. Refer to Regulator Assembly Data (Table 3) for full information on regulator assembly callout digits 4 and 5.

B. The Cylinder Finish (Paint) color callout (digit 6) code is **"0"** for green. Note that the composite cylinder is green (number 14187 per FED STD-595) and the steel cylinder is green (number 24062 per FED STD-595), both callout **"0"**.

C. The Cylinder Assembly Callout specifies both the type (composite or steel) and size of the cylinder. Refer to the Cylinder Data (Table 4) for information on callout digits 7, 8 and 9.

The following are two examples of 898 Series CRA part numbers and their description.

898-HT0C50 is an 898 Series w/ a toggle-operated regulator (SPN 803946-03) and a green 50 ft^3 composite cylinder (SPN 804047-02).

898-DL0S15 is an 898 Series w/ a lever-operated regulator (SPN 804035-02) and a green 115 ft^3 steel cylinder (SPN 804048-06).

Table 3
Regulator Assembly Data

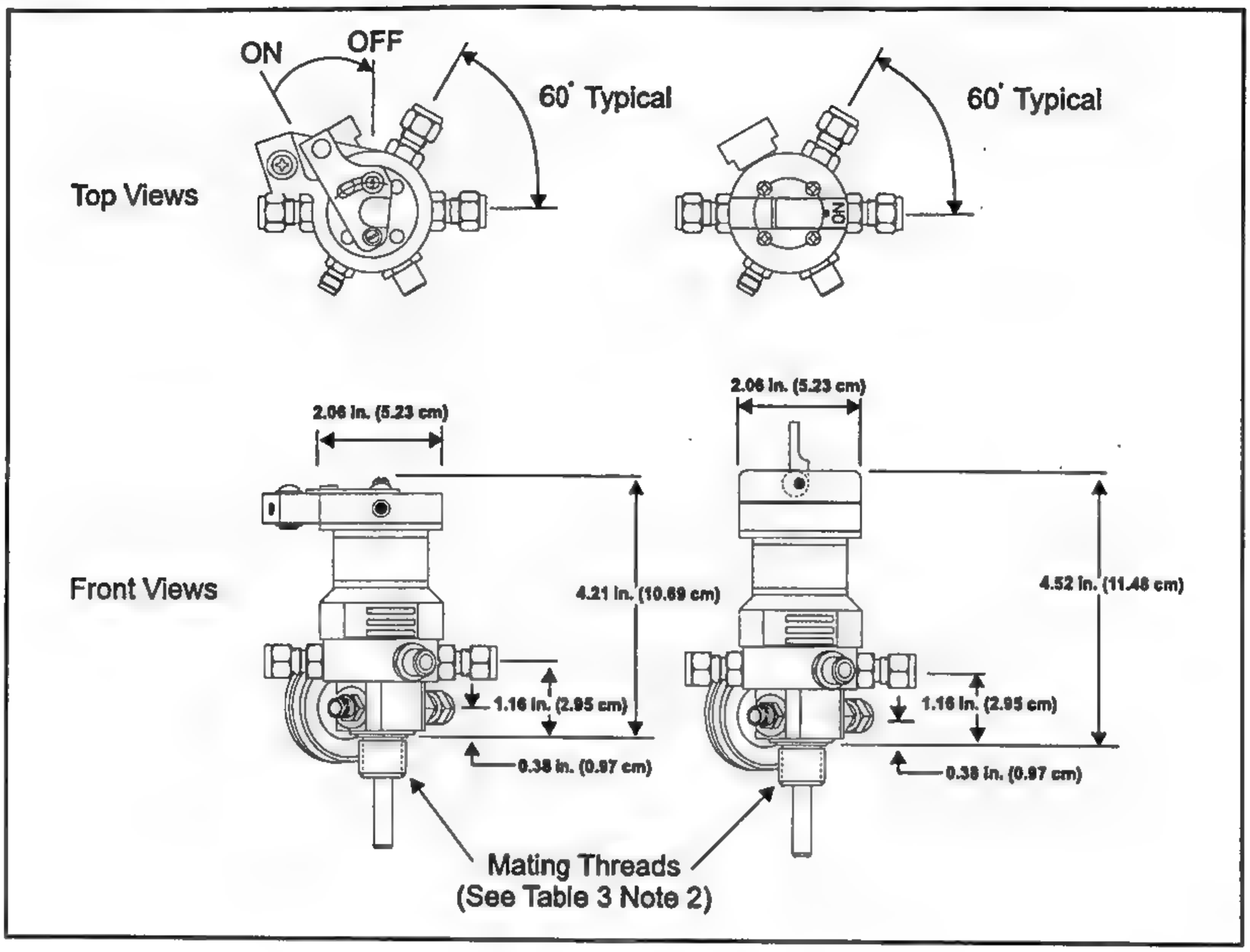
REGULATOR ASSEMBLY CALLOUT (Note 3)		REGULATOR P/N	MAX REG WT lbs (kg) (Note 1)	CYL TYPE (Note 2)
TOGGLE	AT	803946-01	2.1 (0.95)	C
	BT	803946-02	2.1 (0.95)	C
	CT	804034-01	2.3 (1.04)	S
	DT	804034-02	2.3 (1.04)	S
	ET	Regulator Callout **"ET"** is superseded by Regulator Callout **"HT"**.		
	FT	803946-04	2.3 (1.04)	C
	GT	803946-05	2.4 (1.09)	C
	HT	803946-03	3.1 (1.41)	C
	JT	803946-06	2.5 (1.13)	C
	KT	803946-07	3.1 (1.41)	C
LEVER	AL	803980-01	2.1 (0.95)	C
	BL	803980-02	2.1 (0.95)	C
	CL	804035-01	2.3 (1.04)	S
	DL	804035-02	2.3 (1.04)	S

Note 1: Weights **Do Not** include weight of cylinder (Refer to Table 4).
Note 2: The regulator and cylinder are joined together by mating threads. A **"C"** represents a regulator that mates with a composite type cylinder while an **"S"** mates with a steel cylinder. Compare the cylinder callout in Table 4 with the callout digits (7, 8 and 9) on the identification plate (Item 50, IPL Fig.1) if you are not sure which type of cylinder you have.
Note 3: Refer to Figure 3 for basic dimensions on lever and toggle type regulators.

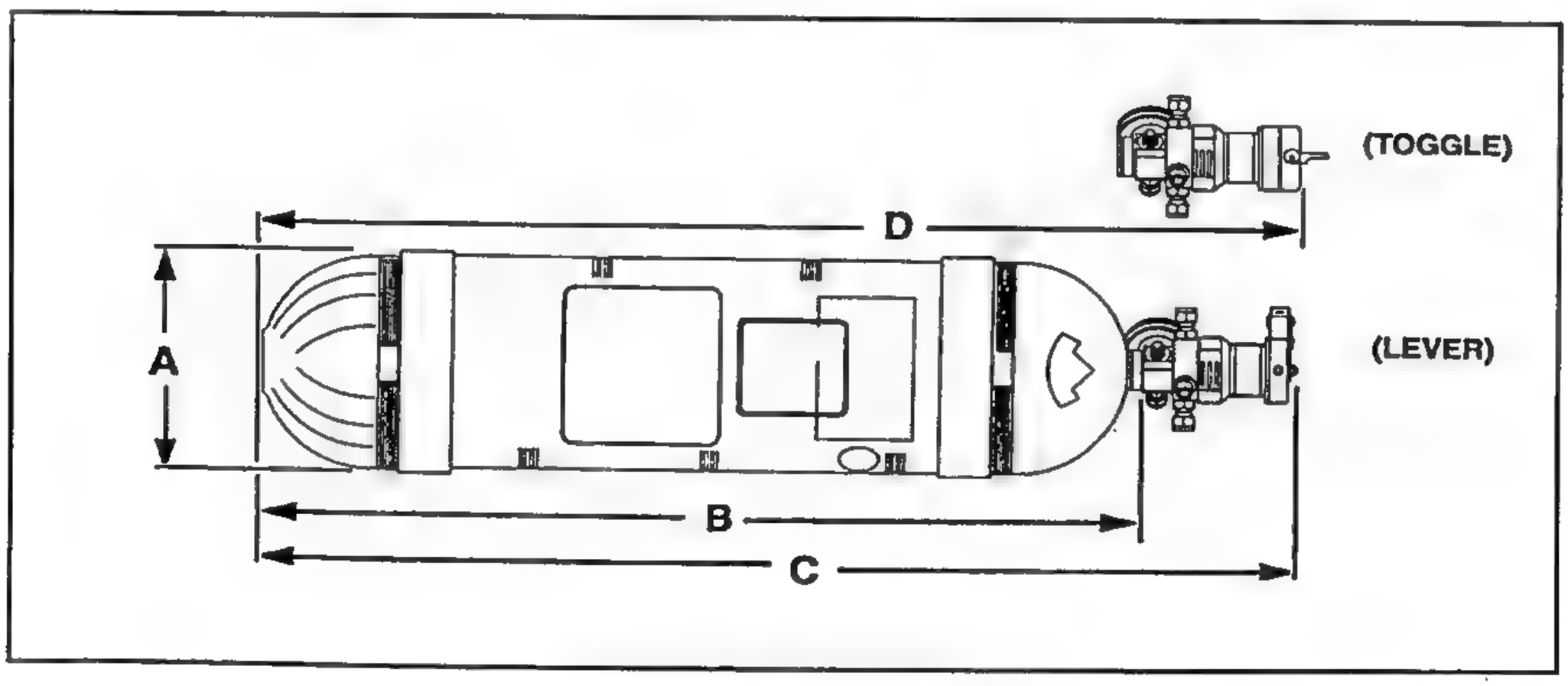
Table 4
Cylinder Data

CYLINDER ASSEMBLY CALLOUT		OXYGEN VOLUME ft^3 (liters)	CYLINDER P/N	THREAD	DIMENSIONS, in. (cm) (Note 2)				CYLINDER WT, lbs (kg) (Note 1)	
					A	B	C	D	EMPTY	CHARGED
COMPOSITE	C22	22.8 (646)	804047-01	0.750 - 16 UNF-2A	5.2 (13.2)	19.6 (49.8)	24.4 (62.0)	24.6 (62.5)	4.0 (1.81)	5.9 (2.68)
	C40	40.0 (1130)	804047-05		6.8 (17.3)	20.2 (51.3)	25.0 (63.5)	25.2 (64.0)	6.7 (3.04)	10.0 (4.54)
	C50	50.1 (1419)	804047-02		6.8 (17.3)	24.7 (62.7)	29.5 (74.9)	29.7 (75.4)	7.9 (3.58)	12.1 (5.49)
	C77	77.1 (2183)	804047-03		7.6 (19.3)	29.3 (74.4)	34.1 (86.6)	34.3 (87.1)	12.9 (5.85)	19.3 (8.75)
	C15	115.7 (3277)	804047-04		9.1 (23.1)	31.3 (79.5)	36.1 (91.7)	36.3 (92.2)	18.1 (8.20)	27.7 (12.6)
STEEL	S22	22.0 (623)	804048-01	1.00 - 11½ ANPT	5.3 (13.5)	18.5 (47.0)	23.1 (58.7)	23.3 (59.2)	10.9 (4.94)	12.8 (5.81)
	S39	39.4 (1116)	804048-02		6.9 (17.5)	19.4 (49.3)	23.9 (60.7)	24.2 (61.5)	13.0 (5.90)	16.3 (7.39)
	S49	49.8 (1410)	804048-03		6.9 (17.5)	23.5 (59.7)	28.1 (71.4)	28.3 (71.9)	15.2 (6.89)	19.4 (8.80)
	S66	66.0 (1869)	804048-04		7.4 (18.8)	26.7 (67.8)	31.3 (79.5)	31.5 (80.0)	20.3 (9.21)	26.3 (11.9)
	S76	76.5 (2166)	804048-05		7.4 (18.8)	30.0 (76.2)	34.6 (87.9)	34.8 (88.4)	22.5 (10.2)	28.8 (13.1)
	S15	115.0 (3257)	804048-06		9.1 (23.1)	29.8 (75.7)	34.4 (87.4)	34.6 (87.9)	34.0 (15.4)	43.5 (19.7)

Note 1: Weights **DO NOT** include weight of regulator assembly (see Table 3)
Note 2: Refer to Figure 4 for description of dimensions. A composite cylinder is shown for reference.



Regulator Assembly Basic Dimensions
Figure 3



CRA Basic Dimensions
Figure 4

7. Operation

The 898 Series CRA is made of two assemblies: a high pressure cylinder assembly (items 30 thru -40E, IPL Fig. 1) and a regulator assembly (items 10 thru -20H, IPL Fig. 1). The cylinder assembly is either a composite type or steel type and stores the high pressure oxygen supplied to the regulator assembly. The regulator assemblies are manually operated and are either a toggle type or a lever type.

A. Cylinder

The cylinder is a US Department of Transportation (DOT) rated pressure vessel that holds oxygen gas at a nominal working pressure of 1800 - 1850 psig (12.4 - 12.8 MPa). The cylinders are made of steel, or light-weight seamless aluminum that is over-wrapped with Kevlar® fiber.

NOTE: Kevlar® is a registered trademark of E.I. du Pont de Nemours & Co.

Information on the cylinder service life and the hydrostatic test frequency requirements can be found in the CHECK section Table 503 (Cylinder Inspection Frequency).

B. Regulator

The regulator is a single inlet self-venting device that has three high-pressure outlets and three low-pressure outlets including a high-pressure safety relief, low-pressure safety relief and cylinder refill port. The lever or toggle assembly used to actuate the oxygen flow can be lockwired in the "ON" or "OFF" position. When the regulator toggle or lever is placed in the "OFF" position oxygen is not available to the low-pressure outlets through the regulator, however, high-pressure oxygen is always available at the high-pressure outlets. When the regulator is placed in the "ON" position, high-pressure oxygen in the cylinder is reduced to low-pressure oxygen and supplied at the low-pressure outlets of the regulator. The regulator can also be configured with high-pressure gauges or transducers to monitor oxygen pressure in the attached cylinder assembly during regulator operation or cylinder refilling. Where required, optional regulator overboard oxygen venting capabilities can also be provided.

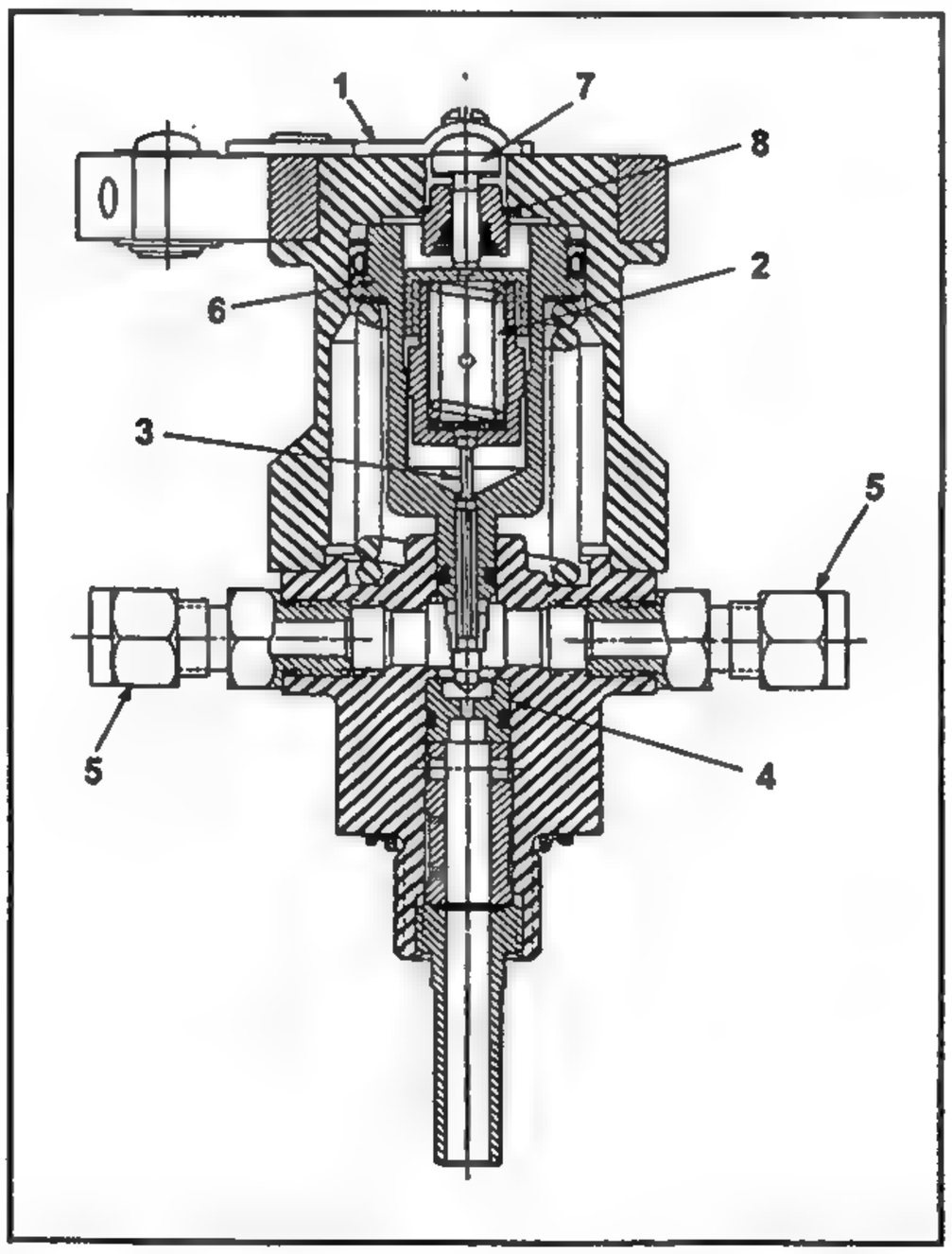
Refer to Figure 5 for a cross-sectioned view of a lever-operated regulator shown in the "ON" position. High-pressure cylinder-oxygen gas is reduced to low pressure by the regulator when the lever (1) or the toggle (not shown) is moved to the "ON" position. This allows the actuation pin (7) to move upward and release the spring force, caused by the spring (2), on the sealing surface between the poppet (3) and seat assembly (4). The poppet moves off the seat a small distance and high-pressure oxygen flows from the cylinder through the orifice in the seat into the low-pressure side of the regulator.

7. Operation (Continued)

B. Regulator (Continued)

Low-pressure oxygen gas, now available at the low-pressure outlets (5) of the regulator, pushes on the top of piston (6). As the regulated gas pressure increases, the force pushing on the top of piston is greater than the regulator's reference spring force and the piston's downward movement allows the poppet to move toward the closed position. As the poppet closes, the regulated gas pressure decreases and the reference spring force becomes greater than the force of the decreasing gas pressure pushing on the top of the piston and moves the piston upward. The upward movement of the piston permits the poppet to move away from the seat increasing the regulated gas pressure.

When the regulator is put in the "OFF" position by movement of either the lever assembly or toggle assembly, the head of the actuation pin (7) is forced downward and the poppet contacts the seat assembly. The force caused by the compression of the spring is enough to provide a good seal between the poppet and the seat. During the closing motion the housing assembly seal (8) is moved off its seat by the actuation pin and the oxygen gas on the low pressure side of the regulator is vented to the atmosphere.



Lever-Operated Regulator (Cross-Sectioned)
Figure 5

TESTING AND FAULT ISOLATION

1. General

This section contains the testing and fault isolation procedures used to evaluate performance of the 898 Series Cylinder and Regulator Assembly (CRA). Should a CRA need repair or have replacement parts installed, it must pass the applicable testing requirements before the unit is available for use. Should a failure occur during testing procedures, refer to the troubleshooting chart (Table 106) for fault isolation.

2. Special Tools, Fixtures and Test Equipment

Special tools, fixtures and test equipment required are presented in Table 101. Fig. No. information provided in the "NOMENCLATURE" column correspond to the tool listing in Table 901 of the SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT section. Unless otherwise noted, one of each item listed is required. Equivalent tools, fixtures or test equipment may be substituted.

Table 101
Special Tools, Fixtures and Test Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Test Plug (0.375 in. - 24 UNF Threads)	Flareless Plug MS21913J3	Local Vendor (V96906)
Preformed Packing (Used with Test Plug MS21913J3)	MS9385-03	Local Vendor (V96906)
	18091-00	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Test Plug (3 required) (0.438 in. - 20 UNF Threads)	10009813	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (3 required) (Used with Test Plug 10009813)	3-904L308-80	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)
	50740-05	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Flowmeter (1.63 - 16.3 lpm) (38.1 - 381 lpm)	"1110" Series 1110CG41CBGAA 1110CK42CBGAA	Brooks Instruments Hatfield, PA 19440-3052 USA (V91556)
Regulator, Test (0 - 2500 psig (0 - 17.2 MPa)) Outlet Pressure	"44-1100" Series 44-1114-24	Tescom Corp. Elk River, MN 55330-2245 USA (V5H642)
Regulator, Test (0 -250 psig (0 - 1.72 MPa)) Outlet Pressure	"26-1600" Series 26-1612-24	Tescom Corp. Elk River, MN 55330-2245 USA (V5H642)

Table 101 (Continued)
Special Tools, Fixtures and Test Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Pressure Gauge (0-160 psig (0-1.10 MPa)) (0-200 psig (0-1.38 MPa)) (0-300 psig (0-2.07 MPa)) (0-2000 psig (0-13.8 MPa)) (0-3000 psig (0-20.7 MPa))	"1403" or "1404" Series	Ametek (U.S. Gauge) Sellersville, PA 18960-2625 USA (V61349)
On/Off Valve (0.250 in. - 18 ANPT Threads)	"P4T" Series B-4P4T4	Whitey Co. Highland Heights, OH 44143 USA (V12623)
Flow Control Valve (2 required) (0.250 in. - 18 ANPT Threads)	"1" Series B-1RF4	Whitey Co. Highland Heights, OH 44143 USA (V12623)
Fractional Tube Adapter (0.250 in. Tube x 0.438 in. - 20 UNF Threads)	"TA-OR-ST" Series B-4-TA-OR-ST	Swagelok Co. Hudson, OH 44236 USA (V0ZLA5)
Plastic Tubing (0.250 in. (6.35 mm) ID x 0.094 in. (2.38 mm) Thick)	Tygon Tubing (R3603 Formulation)	Norton Co. Stow, OH 44224-4306 USA (V61501)
O-Seal Pipe Thread Connector (0.250 in. Tube x 0.125 in. - 27 ANPT Thread)	"OR" Series B-400-1-2-OR	Swagelok Co. Hudson, OH 44236 USA (V0ZLA5)
Tube Adapter (0.250 in. Tube)	"HC-A" Series B-4-HC-A-401	Swagelok Co. Hudson, OH 44236 USA (V0ZLA5)
Soap-Film Meter (0 - 1 cc) (0 - 10 cc)	 4041 4042	AllTech Associates Inc. Deerfield, IL 60015-1828 USA (V55371)
Push/Pull Gauge 0-10 lbs. (0-44 N)	719-10MRP	Ametek-Chatillon Largo, FL 33773 USA (V1CN79)
Test Plug (2 required) (0.125 in. - 27 ANPT Thread) (Fig. 911)	5500-S58-7	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (2 required) (Used with Test Plug 5500-S58-7)	33537-009	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Regulator Test Fixture (Fig. 912)	803440-S58-10	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packings (1 each required) (Used with Regulator Test Fixture 803440-S58-10)	2-230S604-70 and 2-264S604-70	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)

Table 101 (Continued)
Special Tools, Fixtures and Test Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Regulator Test Adapter (0.750 in. -16 UNF Thread) (Fig. 913A)	803440-S58-10-8	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (Used with Regulator Test Adapter 803440-S58-10-8)	2-111S604-70	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)
Regulator Test Adapter (1.00 in. - 11½ ANPT Thread) (Fig. 913B)	803440-S58-10-4	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (Used with Regulator Test Adapter 803440-S58-10-4)	2-119S604-70	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)

3. Test Materials

A list of consumable test materials is presented in Table 102. Equivalent materials may be substituted, except for Oxygen Compatible Lubricant.

Table 102
Consumable Test Materials

MATERIAL	DESCRIPTION	MANUFACTURER (w/ VENDOR CODE)
Test Gas	Oxygen (MIL-PRF-27210, Type I) (Refer to Notes 1 & 2)	Local Vendor
Rust Inhibiting Leak Test Solution	Sodium Chromate; 5 cc per gallon (5 cc per 4 liters) of water	Allied Chemical Corp. Morristown, NJ 07960 USA (V72658)
Leak Test Solution	Sherlock Leak Detector (Type 1) (MIL-L-25567D or Equivalent)	Winton Products Charlotte NC 28236 USA (V23316)
Oxygen Compatible Lubricant	Krytox® 240 AZ (SPN 50521-00)	E.I. du Pont de Nemours & Co Wilmington, DE 19899 USA (V18873)
Leak Check Solution 8 oz. (237 ml) Container (used in Soap-Film Meter (Table 101))	P/N 2025	AllTech Associates Inc. Deerfield, IL 60015-1828 USA (V55371)

Note 1: Oxygen (MIL-PRF-27210, Type I) is the test gas specified in the test procedures in this section of the manual. If water pumped Nitrogen or Air (equivalent in purity to MIL-PRF-27210, Type I) is used for the test gas, the applicable test parameters must have the appropriate density correction factors calculated and used, and the test equipment must be calibrated for the test gas being used.

Note 2: A copy of specifications for Oxygen (MIL-PRF-27210, Type I) and Nitrogen (BB-N-411, Type I, Class I, Grade A) are available from: Superintendent of Documents, US Government Printing Office, Washington, DC 20402, USA (Vendor Code 81955).

NOTE: Krytox® is a Registered Trademark of E.I. du Pont de Nemours & Company

4. Regulator Test Procedures

WARNING: DO NOT, UNDER ANY CIRCUMSTANCES, USE OIL PUMPED GAS AS THIS WILL CAUSE CONTAMINATION OF THE CRA AND THE TEST EQUIPMENT. OIL, EVEN IN MINUTE QUANTITY, COMING IN CONTACT WITH OXYGEN MAY CAUSE AN EXPLOSION OR FIRE.

FAILURE TO FULLY DISCHARGE THE REGULATOR ASSEMBLY OF OXYGEN PRIOR TO DISASSEMBLY OF ANY PART MAY CAUSE SERIOUS PERSONAL INJURY OR DEATH.

Unless otherwise noted, coat all Preformed Packings (Table 101) with Oxygen Compatible Lubricant (Table 102).

4. Regulator Test Procedures (Continued)

Unless otherwise noted, refer to Figure 2 in the ILLUSTRATED PARTS LIST section to identify ITEM NO.'s shown in parenthesis after the name of the part being tested.

Refer to Figure 701 in the ASSEMBLY section to locate the high-pressure ports (H-1, H-2, H-3), low-pressure ports (L-1, L-2, L-3) and port thread sizes on the body assembly (-330, -330A).

A. Regulator and Testing Equipment Setup

Unless otherwise instructed, set up regulator and test equipment as follows:

(1) Install Test Plug (including Preformed Packing (Table 101)) in the regulator body assembly (-330, -330A) at high pressure ports H-1, H-2, H-3 and low-pressure port L-2 and L-3, if these ports do not already contain an applicable fitting.

NOTE: Test Plug SPN 10009813 is used for regulator body assembly ports L-1, L-2 and H-3. Also, Test Plug MS21913J3 is used for port H-2 and Test Plug SPN 5500-S58-7 is used for ports L-3 and H-3.

(2) Refer to Table 103 for proper combination of Regulator Test Adapter (Table 101) and Preformed Packing that are used with Regulator Test Fixture (Table 101, SPN 803440-S58-10).

Table 103
Regulator Test Fixture Setup Table

REGULATOR TEST ADAPTER P/N	REGULATOR TEST FIXTURE P/N (Note 2)	REGULATOR THREAD SIZE
803440-S58-10-4 (Note 1)	803440-S58-10	1.00 - 11½ ANPT Threads (Note 3)
803440-S58-10-8 (Note 1)		0.750 - 16 UNF Threads (Note 4)

Note 1: Use Preformed Packing (Table 101) P/N 2-119S604-70 with Regulator Adapter P/N 803440-S58-10-4 or Preformed Packing (Table 101) P/N 2-111S604-70 with Regulator Adapter P/N 803440-S58-10-8
Note 2: Use Preformed Packing (Table 101) P/N 2-230S604-70 **and** P/N 2-264S604-70 on Regulator Test Fixture (P/N 803440-S58-10) base plate.
Note 3: Mates with steel cylinders (Items -40 thru -40E, IPL Fig. 1).
Note 4: Mates with composite cylinders (Items 30 thru -30D, IPL Fig. 1).

4. Regulator Test Procedures (Continued)

B. Regulator Functional Test

Refer to Figure 101.

CAUTION: CLOSE THE ON/OFF VALVE WHEN PRESSURIZING THE REGULATOR INLET ABOVE 300 psig (2.07 MPa) TO PREVENT DAMAGE TO THE 300 psig (2.07 MPa) INLET PRESSURE GAUGE.

(1) Place On/Off Valve for the 0 - 300 psig (0 - 2.07 MPa) inlet Pressure Gauge (Table 101) in the "CLOSED" position.

(2) Place the regulator toggle (145) or regulator lever (205) in the "OFF" position and pressurize the regulator inlet to 1850 psig (12.8 MPa).

(3) Operate the regulator toggle (145) or regulator lever (205) from the "OFF" to the "ON" position several times.

(4) Place the regulator toggle (145) or the regulator lever (205) in the "ON" position.

(5) Close Flow Control Valve No. 2. Hold the inlet pressure at 1850 psig (12.8 MPa) and adjust the flow rate of Flowmeter No. 1 to 5 lpm NTPD using Flow Control Valve No. 1.

(6) Observe the outlet Pressure Gauge (Table 101). The Pressure Gauge should be at 78 - 80 psig (0.538 - 0.552 MPa).

(7) Remove the 1850 psig (12.8 MPa) pressure from inlet of the regulator. Place the regulator toggle (145) or the regulator lever (205) in the "OFF" position.

(8) Discharge all oxygen from the regulator assembly.

C. Regulator Flow Test

Refer to Figure 101.

CAUTION: CLOSE THE ON/OFF VALVE WHEN PRESSURIZING THE REGULATOR INLET ABOVE 300 psig (2.07 MPa) TO PREVENT DAMAGE TO THE 300 psig (2.07 MPa) INLET PRESSURE GAUGE.

(1) Place On/Off Valve for the 0 - 300 psig (0 - 2.07 MPa) inlet Pressure Gauge (Table 101) in the "CLOSED" position.

(2) Place the regulator toggle (145) or regulator lever (205) in the "OFF" position and pressurize the regulator inlet to 1850 psig (12.8 MPa).

(3) Place the regulator toggle (145) or regulator lever (205) in the "ON" position.

(4) Close Flow Control Valve No. 2. Hold the inlet pressure at 1850 psig (12.8 MPa) and adjust the flow rate of Flowmeter No. 1 for 2 - 3 lpm NTPD using Flow Control Valve No.1. The outlet pressure must be 60 - 84 psig (0.41 - 0.58 MPa).

4. Regulator Test Procedures (Continued)

C. Regulator Flow Test (Continued)

(5) Close Flow Control Valve No. 1. Hold the inlet pressure at 1850 psig (12.8 MPa) and adjust the flow rate of Flowmeter No. 2 for 320 - 350 lpm NTPD using Flow Control Valve No. 2. The outlet pressure must be 60 - 80 psig (0.41 - 0.55 MPa).

(6) Close Flow Control Valve No. 2.

(7) With Flow Control Valves 1 and 2 fully closed, adjust and maintain 1850 psig (12.8 MPa) at inlet of regulator for at least two minutes. The outlet pressure must remain at a constant pressure and not exceed 90 psig (0.62 MPa).

(8) Adjust inlet pressure to 150 - 155 psig (1.03 -1.07 MPa).

(9) Place On/Off Valve in the "OPEN" position.

(10) Close Flow Control Valve No. 2. Hold the inlet pressure at 150 - 155 psig (1.03 - 1.07 MPa) and adjust the flow rate of Flowmeter No. 1 for 2 - 3 lpm NTPD using Flow Control Valve No.1. The outlet pressure must be 60 - 84 psig (0.41 - 0.58 MPa).

(11) Close Flow Control Valve No. 1. Hold the inlet pressure at 150 -155 psig (1.03 - 1.07 MPa) and adjust the flow rate of Flowmeter No. 2 for 320 - 350 lpm NTPD using Flow Control Valve No. 2. The outlet pressure must be 60 - 80 psig (0.41 - 0.55 MPa).

(12) Remove the 150 - 155 psig (1.03 - 1.07 MPa) pressure from the regulator inlet. Place the regulator toggle (145) or regulator lever (205) in the "OFF" position.

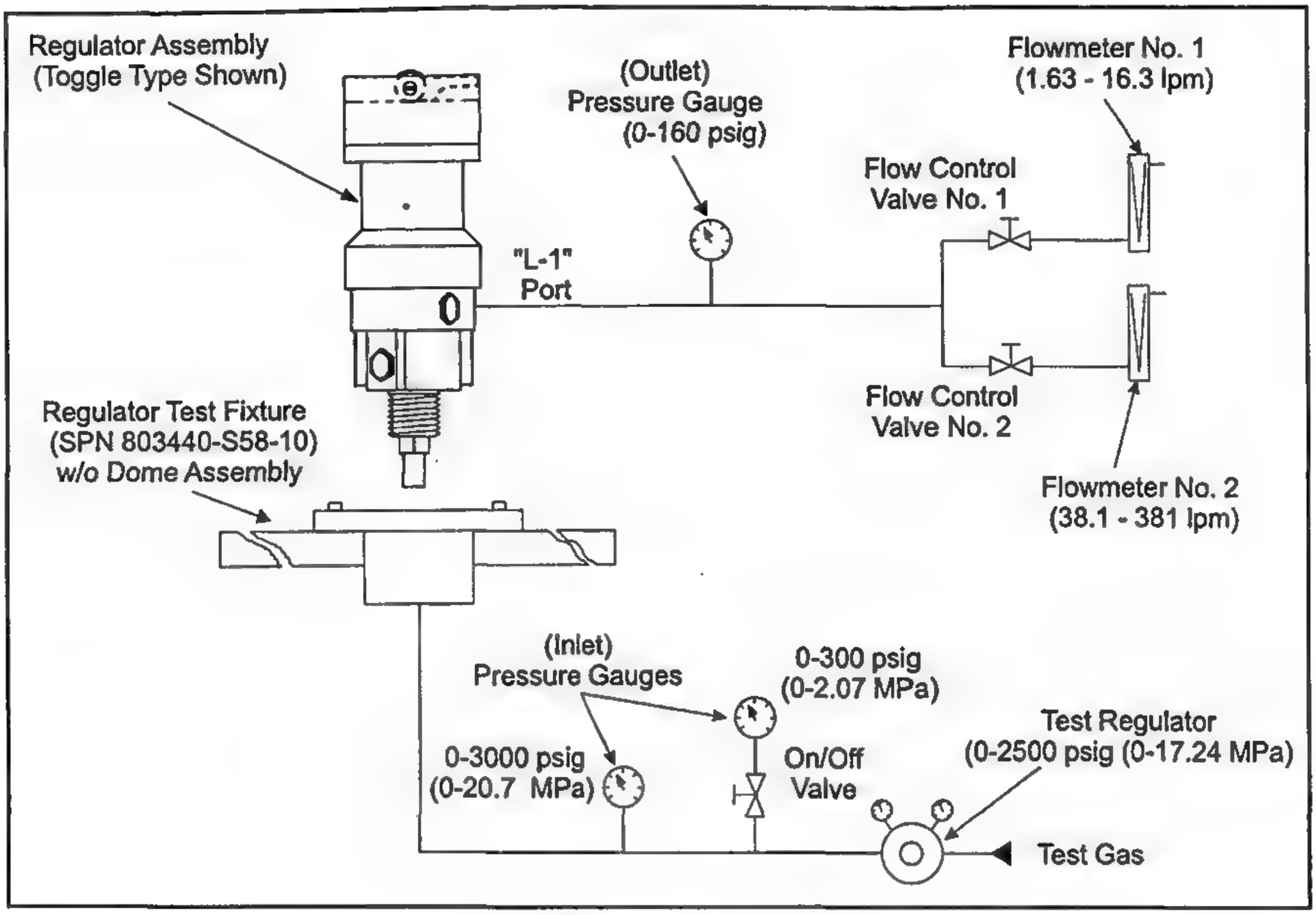
(13) Discharge all oxygen from the regulator assembly.

D. Toggle Operation Test

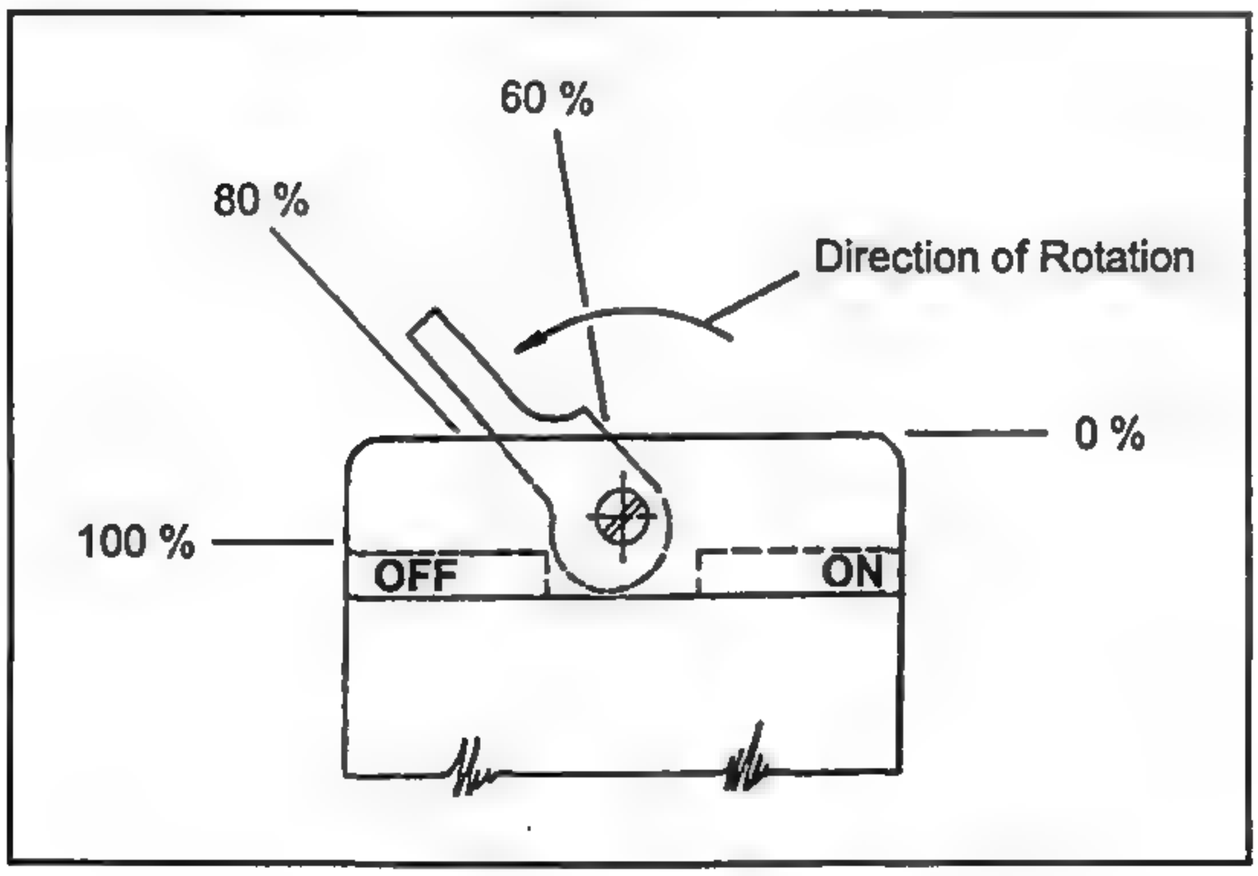
This test applies only to Toggle Regulators (-1D thru -1M).

The purpose of this test is to determine when the toggle (145), as it moves from the "ON" position to the "OFF" position, forces the poppet (260) to contact the seat (350) and stop flow at the regulator outlets. Also, this test demonstrates that as the actuation pin (310) moves off the housing assembly seal (325) the regulator outlets are vented as the regulator closes.

Refer to Figure 101 and Figure 102.



Regulator Test Setup
Figure 101



Toggle Operation Test
Figure 102

4. Regulator Test Procedures (Continued)

D. Toggle Operation Test (Continued)

CAUTION: CLOSE THE ON/OFF VALVE WHEN PRESSURIZING THE REGULATOR INLET ABOVE 300 psig (2.07 MPa) TO PREVENT DAMAGE TO THE 300 psig (2.07 MPa) INLET PRESSURE GAUGE.

(1) Place the On/Off Valve in the "CLOSED" position.

(2) Place the regulator toggle (145) in the "OFF" position and pressurize the regulator inlet to 1850 psig (12.8 MPa).

(3) Place the regulator toggle in the "ON' position.

(4) Close Flow Control Valve No. 2. Hold the inlet pressure at 1850 psig (12.8 MPa) and adjust the flow rate of Flowmeter No. 1 for 10 lpm NTPD using Flow Control Valve No. 1.

(5) Slowly move the regulator toggle toward the "OFF" position. Observe the position of the toggle when the flow stops and the regulator vents to 0 psig (0 MPa) outlet pressure. The regulator toggle must be at a point between 60 to 80 percent (as shown in Figure 102) of its full travel distance.

(6) Place the regulator toggle in the "ON" position.

(7) Place the toggle in the "OFF" position. The outlet pressure shall vent to 0 psig (0 MPa) within one minute.

(8) Remove the 1850 psig (12.8 MPa) pressure from the regulator inlet.

(9) Discharge all oxygen from the regulator assembly.

E. Lever Operation Test

This test applies only to Lever Regulators (-1 thru -1C).

The purpose of this test is to determine when the lever (205), as it moves from the "ON" position to the "OFF" position, forces the poppet (260) to contact the seat (350) and stop flow at the regulator outlets. Also, this test demonstrates that as the actuation pin (310) moves off the housing assembly seal (325) the regulator outlets are vented as the regulator closes.

Refer to Figure 101 and Figure 103.

CAUTION: CLOSE THE ON/OFF VALVE WHEN PRESSURIZING THE REGULATOR INLET ABOVE 300 psig (2.07 MPa) TO PREVENT DAMAGE TO THE 300 psig (2.07 MPa) INLET PRESSURE GAUGE.

(1) Place the On/Off Valve in the "CLOSED" position.

(2) Place the regulator lever (205) in the "OFF" position and pressurize the regulator inlet to 1850 psig (12.8 MPa).

4. Regulator Test Procedures (Continued)

E. Lever Operation Test (Continued)

(3) Place the regulator lever in the "ON" position.

(4) Close Flow Control Valve No. 2. Hold the inlet pressure at 1850 psig (12.8 MPa) and adjust the flow rate of Flowmeter No. 1 for 10 - 15 lpm NTPD using Flow Control Valve No. 1.

(5) Slowly move the regulator lever to the "OFF" position. When the regulator lever indicating edge (Figure 103) is between 50 - 75 percent of the travel to the full "OFF" position flow through the regulator should stop.

(6) Without moving the regulator lever from its position in Paragraph 4.E.(5), close Flow Control Valve No. 1. The outlet pressure should decrease to 0 psig (0 MPa) within 1 minute.

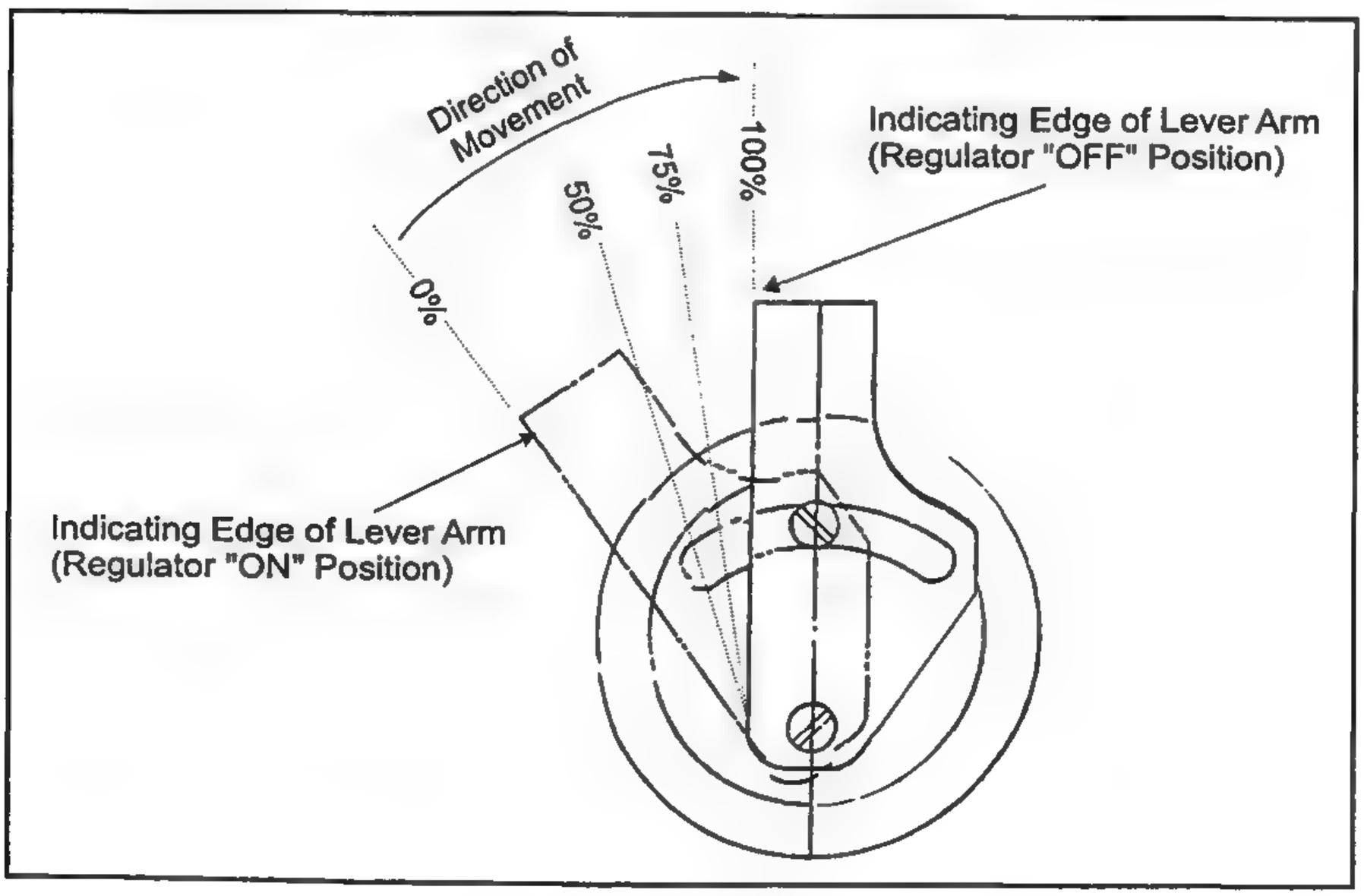
(7) Place regulator lever in the "ON" position.

(8) Open Flow Control Valve No. 1 and adjust the flow rate of Flowmeter No. 1 for 10 - 15 lpm NTPD.

(9) Move the regulator lever to the full "OFF" position. Both the indicated flow on Flowmeter No. 1 and the outlet pressure should be zero within one minute.

(10) Remove the 1850 psig (12.8 MPa) pressure from the regulator inlet.

(11) Discharge all oxygen from the regulator assembly.



Lever Operation Test
Figure 103

4. Regulator Test Procedures (Continued)

F. Lever Actuation Force Test

This test applies only to Lever Regulators (-1 thru -1C).

The purpose of this test is to determine force required to move the regulator lever (205) from either the "OFF" or "ON" position when the regulator is pressurized.

Refer to Figures 104 and 105.

(1) Attach Test Plug (Table 101) SPN 10009813 with Preformed Packing (Table 101) P/N 3-904I308-80 to regulator assembly low-pressure port L-1.

(2) Attach regulator assembly (1 thru -1C) to Regulator Test Fixture (SPN 803440-S58-10).

CAUTION: CLOSE THE ON/OFF VALVE WHEN PRESSURIZING THE REGULATOR INLET ABOVE 300 psig (2.07 MPa) TO PREVENT DAMAGE TO THE 300 psig (2.07 MPa) INLET PRESSURE GAUGE.

(3) Place the On/Off Valve in the "CLOSED" position.

(4) Place the regulator lever (205) in the "OFF" position and pressurize the regulator inlet to 1800 - 1850 psig (12.4 - 12.8 MPa).

(5) Refer to Figure 105 and attach the Push/Pull Gauge (Table 101) to the straight pin (190) so that the direction of pull will be parallel to the movement of the lever.

(6) Using the Push/Pull Gauge, pull the lever to the "ON" position. Record force necessary to move the lever to the full "ON" position.

(7) Using the Push/Pull Gauge, pull the lever to the "OFF" position. Record force necessary to move the lever to the full "OFF" position.

(8) Reduce pressure to the regulator inlet to 150 - 200 psig (1.03 - 1.38 MPa).

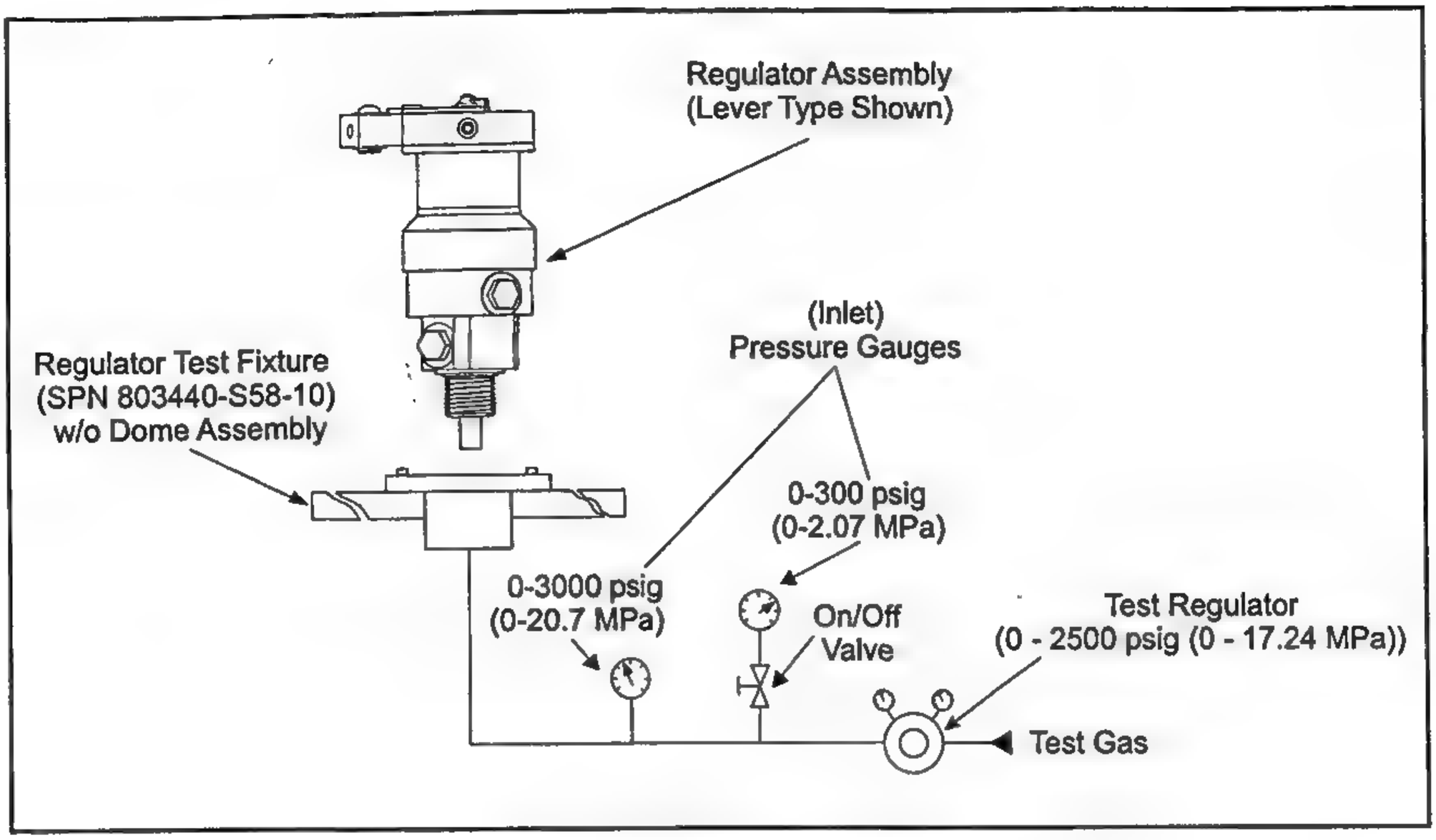
(9) Place the On/Off Valve in the "OPEN" position.

(10) Repeat steps (6) and (7) in Paragraph 4.F. above.

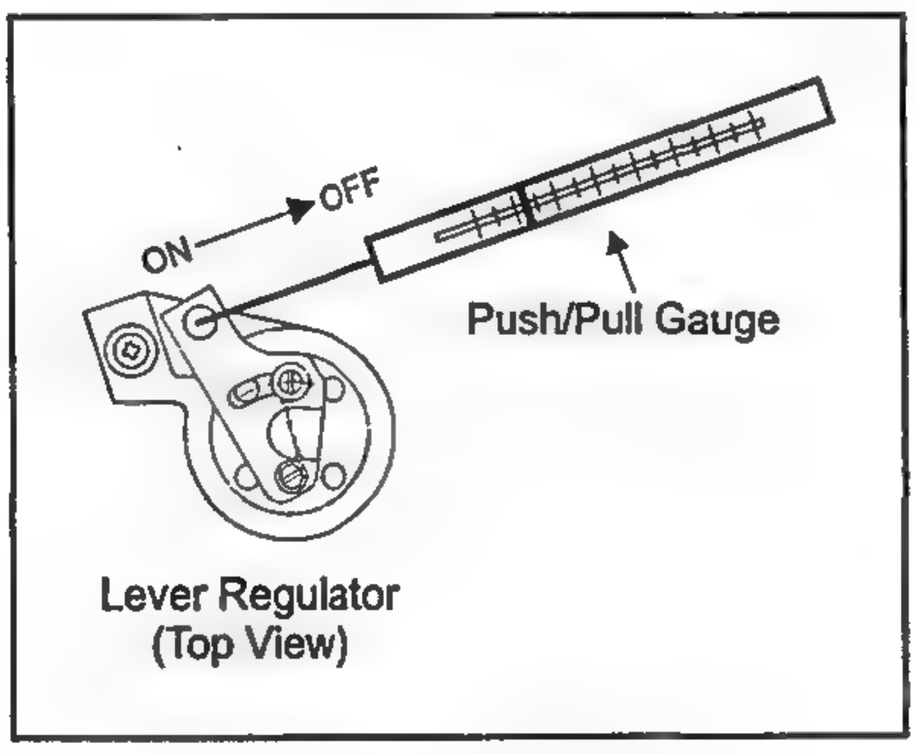
(11) Remove the 150 - 200 psig (1.03 - 1.38 MPa) pressure from the regulator inlet.

(12) The force required to move the lever to the full "ON" or "OFF" positions at inlet pressure in the ranges specified must not exceed 8.0 lbs (35.6 N).

(13) Discharge all oxygen from the regulator assembly.



Lever Actuation Force Test Setup
Figure 104



Push/Pull Gauge Setup
Figure 105

4. Regulator Test Procedures (Continued)

G. Regulator Internal Leakage Test

Refer to Figure 106.

CAUTION: CLOSE THE ON/OFF VALVE WHEN PRESSURIZING THE REGULATOR INLET ABOVE 300 psig (2.07 MPa) TO PREVENT DAMAGE TO THE 300 psig (2.07 MPa) INLET PRESSURE GAUGE.

(1) Place the On/Off Valve in the "CLOSED" position.

(2) Place the regulator toggle (145) or the regulator lever (205) in the "OFF" position and pressurize the regulator inlet to 1850 psig (12.8 MPa).

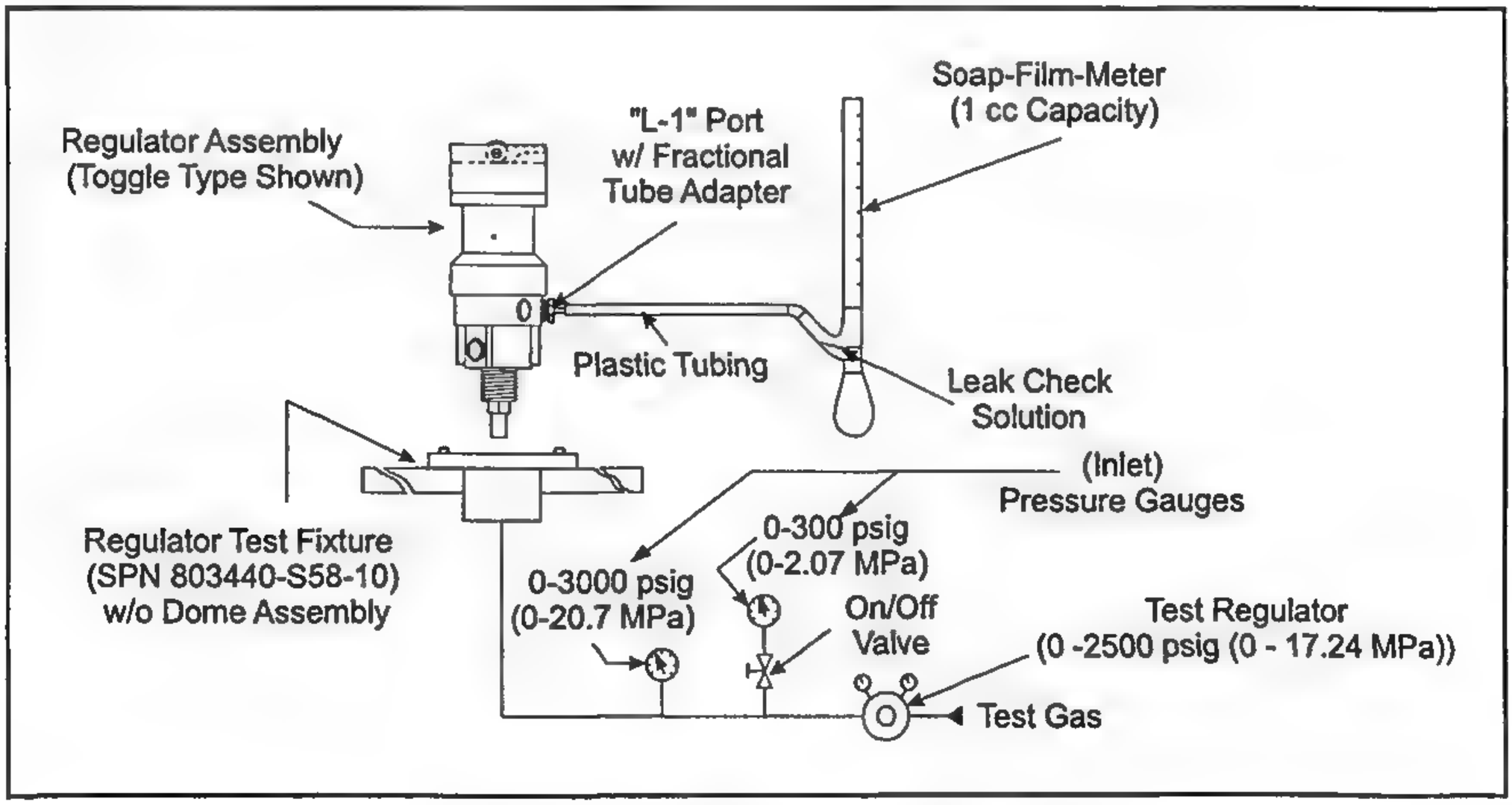
(3) Slowly squeeze the bulb on the bottom of the 0-1 cc Soap-Film Meter (Table 101) allowing Leak Check Solution (Table 102) to rise in tube, forming a bubble by contact with oxygen (if present) leaking from the regulator through port L-1.

(4) Observe the rise of any bubble formed in the 0-1 cc Soap-Film Meter tube over a known period of time. Leakage shall not exceed 1 cc in 5 minutes.

(5) Remove the plastic tubing from the 0-1 cc Soap-Film Meter.

(6) Remove the 1850 psig (12.8 MPa) pressure from the regulator inlet.

(7) Discharge all oxygen from the regulator assembly.



Regulator Internal Leakage Test Setup
Figure 106

4. Regulator Test Procedures (Continued)

H. Regulator External Leakage Test

Refer to Figure 107.

(1) Attach Test Plug (Table 101) SPN 10009813 with Preformed Packing (Table 101) P/N 3-904L308-80 to regulator assembly low-pressure port L-1.

(2) Attach regulator assembly (-1 thru -1M) to Regulator Test Fixture SPN 803440-S58-10.

(3) Place regulator toggle (145) or regulator lever (205) in the "ON" position.

(4) Attach and seal the Dome to the Base Plate (both are part of Regulator Test Fixture SPN 803440-S58-10) using Preformed Packing (Table 101) P/N 2-264S604-70.

(5) Attach O-Seal Pipe Thread Connector (Table 101) with mating Tube Adapter (Table 101) at the top of the Regulator Test Fixture Dome.

(6) Connect Plastic Tubing (Table 101) to the Tube Adapter which is mated with the O-Seal Pipe Thread Connector (Para. 4.H.(5)).

(7) Place the other end of Plastic Tubing onto the 0-10 cc Soap-Film Meter (Table101).

CAUTION: CLOSE THE ON/OFF VALVE WHEN PRESSURIZING THE REGULATOR INLET ABOVE 300 psig (2.07 MPa) TO PREVENT DAMAGE TO THE 300 psig (2.07 MPa) INLET PRESSURE GAUGE.

(8) Place the On/Off Valve in the "CLOSED" position.

(9) Apply 1850 psig (12.8 MPa) pressure to the regulator inlet.

(10) Slowly squeeze the bulb on the bottom of the 0-10 cc Soap-Film Meter (Table 101) allowing Leak Check Solution (Table 102) to rise in tube, forming a bubble by contact with oxygen (if present) leaking from the regulator assembly.

(11) Observe the rise of any bubble formed in the 0-10 cc Soap-Film Meter tube over a known period of time. Leakage shall not exceed 10 cc in 5 minutes.

(12) Adjust regulator inlet pressure to 200 - 250 psig (1.38 - 1.72 MPa).

(13) Place the On/Off Valve in the "OPEN" position.

(14) Repeat steps 4.H.(10) and 4.H.(11)

(15) Remove the Plastic Tubing from the 0-10 cc Soap-Film Meter.

(16) Remove the O-Seal Pipe Tread Connector and mating Tube Adapter from the top of the Dome. Remove Dome from the Regulator Test Fixture.

(17) If leakage was detected, brush on Leak Test Solution (Table 102) on all areas of the regulator assembly that external leakage can occur. Bubbles will show where leaks are. Dry extreior of regulator assembly with clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C).

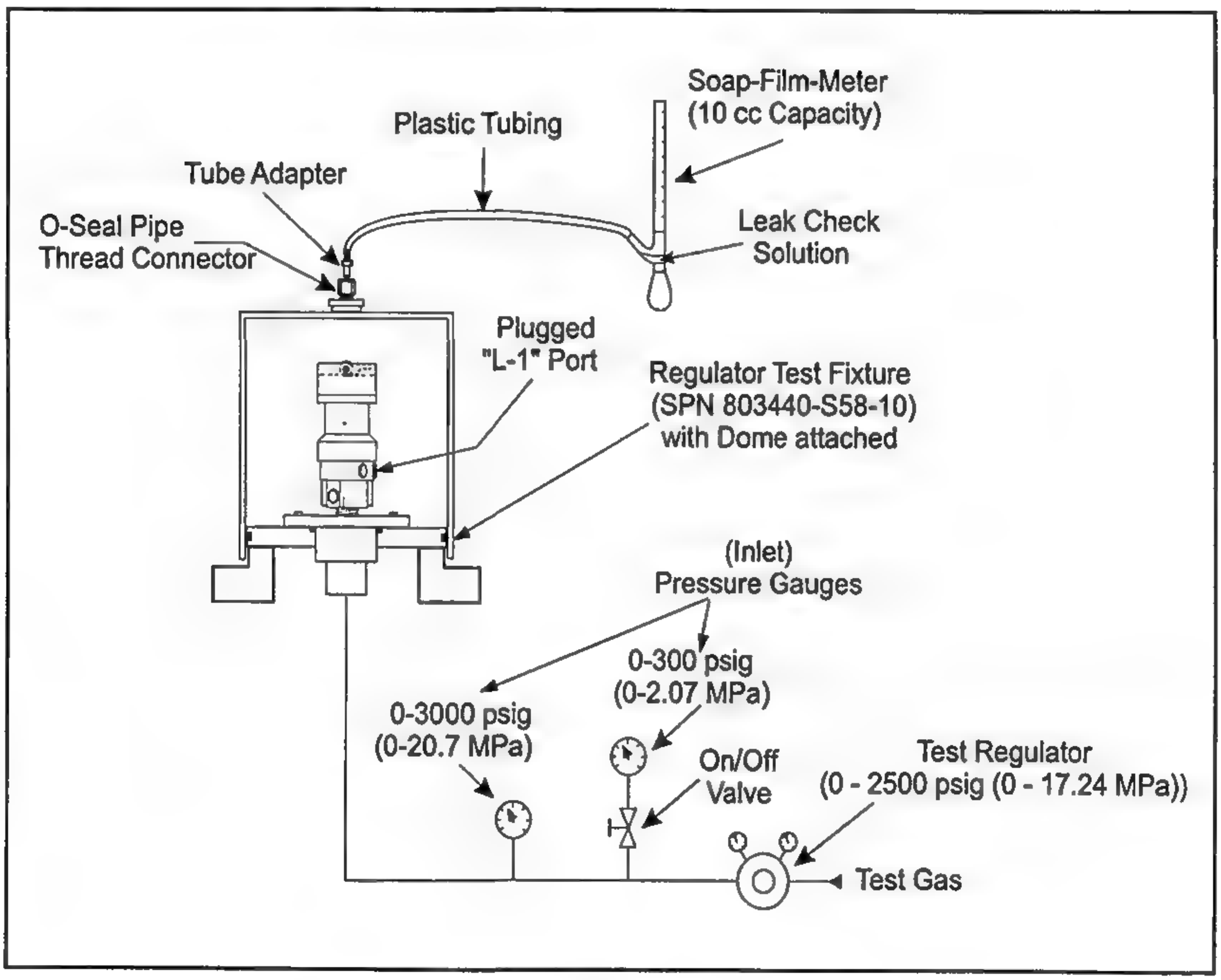
4. Regulator Test Procedures (Continued)

H. Regulator External Leakage Test (Continued)

(18) Remove the 200 - 250 psig (1.38 - 1.72 MPa) pressure from the regulator inlet.

(19) Place the regulator toggle (145) or the regulator lever (205) in the "OFF" position.

(20) Discharge all oxygen from the regulator assembly and remove regulator assembly from Regulator Test Fixture.



Regulator External Leakage Test Setup
Figure 107

5. Component Test Procedures

NOTE: In all procedures listed below, oxygen is specified as the Test Gas (Table 102). Water-pumped nitrogen or oil-free air may be substituted.

WARNING: DO NOT, UNDER ANY CIRCUMSTANCES, USE OIL-PUMPED GAS AS THIS WILL CAUSE CONTAMINATION OF THE (CRA) AND THE TEST EQUIPMENT. OIL, EVEN IN MINUTE QUANTITY, COMING IN CONTACT WITH OXYGEN MAY CAUSE AN EXPLOSION OR FIRE.

FAILURE TO FULLY DISCHARGE THE TEST SYSTEM OF OXYGEN PRIOR TO DISASSEMBLY OF ANY PART MAY CAUSE SERIOUS PERSONAL INJURY OR DEATH.

Refer to IPL Figure 2 to identify item numbers, unless otherwise noted.

A. Pressure/Temperature Transducer Test

Refer to Figure 108, Figure 109, Table 104 and Table 105.

(1) Pressure Accuracy Test

(a) Refer to Figure 108 and connect pressure/temperature transducer (385) to a regulated Test Gas (Table 102) source.

(b) Refer to Figure 109 and Table 104 and connect pressure/temperature transducer (385) to a 28 VDC Regulated Power Supply at pins A and D. Also, connect a Digital Voltmeter to pins B and C.

(c) While maintaining the transducer at a temperature of 70 ±18°F (21 ±10°C), apply each inlet pressure shown in Table 105. The appropriate output voltage shall be within the limits shown in Table 105 for each inlet pressure applied.

(d) Reduce oxygen supply pressure and open the On/Off Valve (Table 101) to reduce the inlet pressure to the pressure/temperature transducer to 0 psig (0 MPa).

(e) Remove pressure/temperature transducer from test setup.

(2) Temperature Accuracy Test

Transducer input pressure will be 0 psig (0 MPa) and the effective temperature range will be -65 to +140 °F (-54 to +60 °C) for the Temperature Accuracy Test.

(a) Refer to Figure 109 and Table 104 and connect pressure/temperature transducer (385, IPL Fig. 2) to a 28 VDC Regulated Power Supply at pins A and D. Also, connect a Digital Voltmeter to pins E and F.

(b) Expose the transducer to a known temperature. Calculate the corresponding output voltage using the equation below for exposure temperatures in degrees Fahrenheit. The measured output voltage shall be within the limits calculated from this equation.

5. Component Test Procedures (Continued)

A. Pressure/Temperature Transducer Test (Continued)

(2) Temperature Accuracy Test (Continued)

(b) Expose the transducer ... (Continued)

$$V_o = [0.025\ (T_e)\ + 1.50]\ \pm\ 0.09\ VDC$$

Where:

V_o = Allowable Transducer Output Voltage (VDC)
T_e = Transducer Exposure Temperature (^oF)
^oF =[1.8 (^oC) + 32]
^oC = Degrees Celsius
VDC = Volts Direct Current

example: Calculate allowable output voltage range (V_o) at 52 ^oF.

$V_o = [0.025\ (52) + 1.50] \pm 0.09\ VDC$

$V_o = 2.8 \pm 0.09\ VDC$

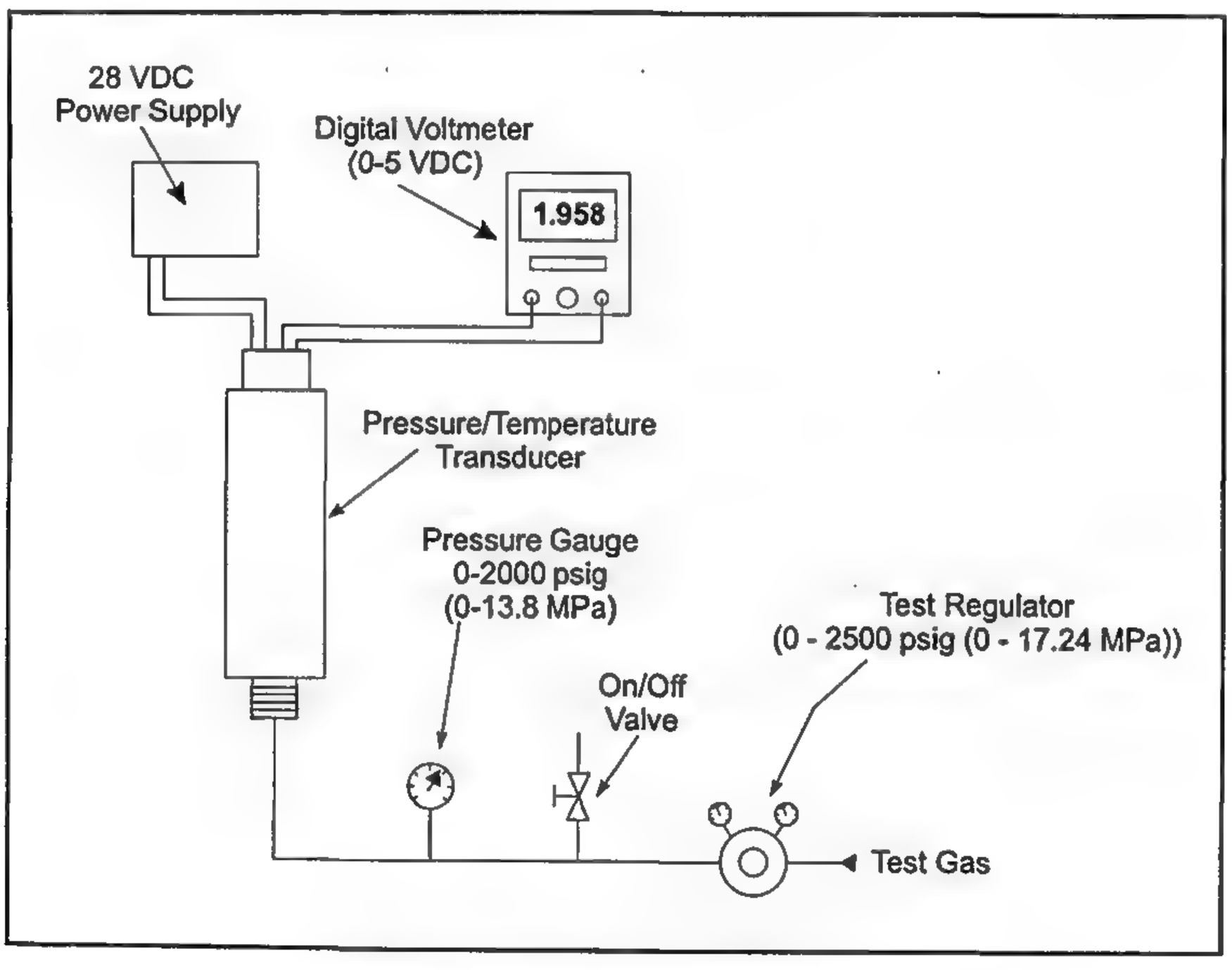
$V_o = 2.71$ to $2.89\ VDC$

Table 104
Pressure/Temperature Transducer Input/Output Connections

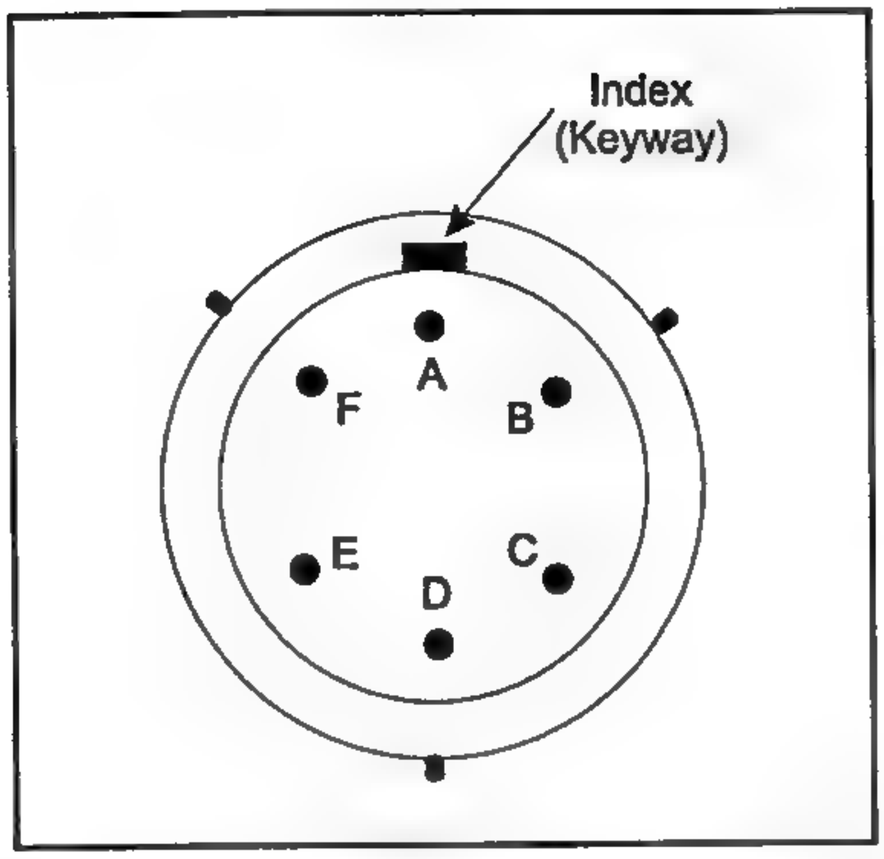
PIN LABEL	DESCRIPTION
A	+28 VDC Supply
B	Pressure Signal Output
C	Pressure Signal Reference
D	0 VDC Supply
E	Temperature Signal Output
F	Temperature Signal Reference

Table 105
Pressure Accuracy Specifications

TRANSDUCER INLET PRESSURE psig (MPa)	TRANSDUCER OUTPUT VOLTAGE LIMITS VDC
300 ± 15 (2.07 ± 0.10)	0.455 to 0.545
600 ± 30 (4.14 ± 0.21)	0.955 to 1.045
1200 ± 60 (8.27 ± 0.41)	1.955 to 2.045
1800 ± 90 (12.41 ± 0.62)	2.955 to 3.045



Pressure/Temperature Transducer Test
Figure 108



Transducer Contact (Pin) Locator
(Top View of Transducer)
Figure 109

5. Component Test Procedures (Continued)

B. Relief Valve Pressure Test

Refer to Figure 110.

A relief valve which does not pass the following test must be replaced:

(1) Attach relief valve (65, -65A) to a regulated oxygen source and immerse the relief valve in a container of Rust Inhibiting Leak Test Solution as shown in Figure 110.

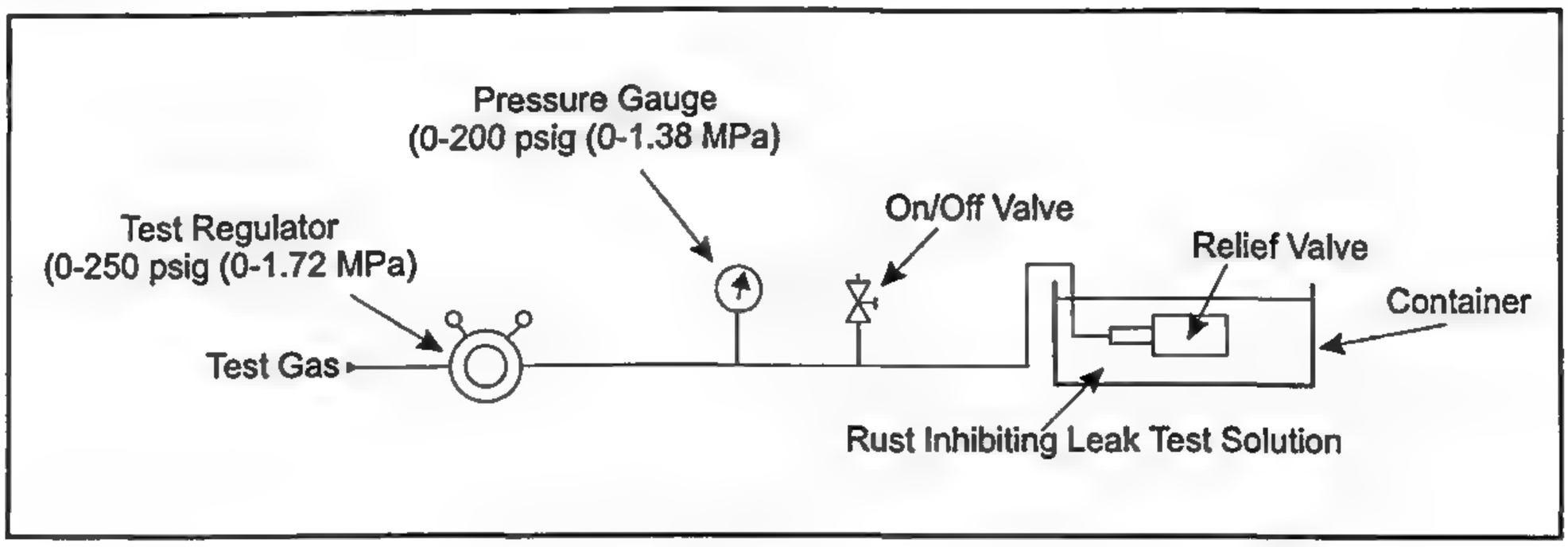
(2) Apply 90 psig (0.62 MPa) to the relief valve. There must be zero leakage from the relief valve.

NOTE: Lack of bubbles in the Rust Inhibiting Leak Test Solution at the relief valve outlet is an indication of zero leakage.

(3) Remove the relief valve from the Rust Inhibiting Leak Test Solution and apply 130 psig (0.90 MPa) to the relief valve. The relief valve should allow oxygen to flow through the outlet opening.

(4) Lower the pressure from the oxygen source to 90 psig (0.62 MPa). Immerse relief valve in Rust Inhibiting Leak Test Solution. There must be zero leakage from the relief valve.

(5) Reduce oxygen supply pressure to 0 psig (0 MPa) remove the relief valve from the test setup. Dry the relief valve in clean, dry air that is oil-free and heated (180 - 200 °F (82 - 93 °C)).



Low Pressure Relief Valve Test Setup
Figure 110

5. Component Test Procedures (Continued)

   C. Pressure Gauge Accuracy Test

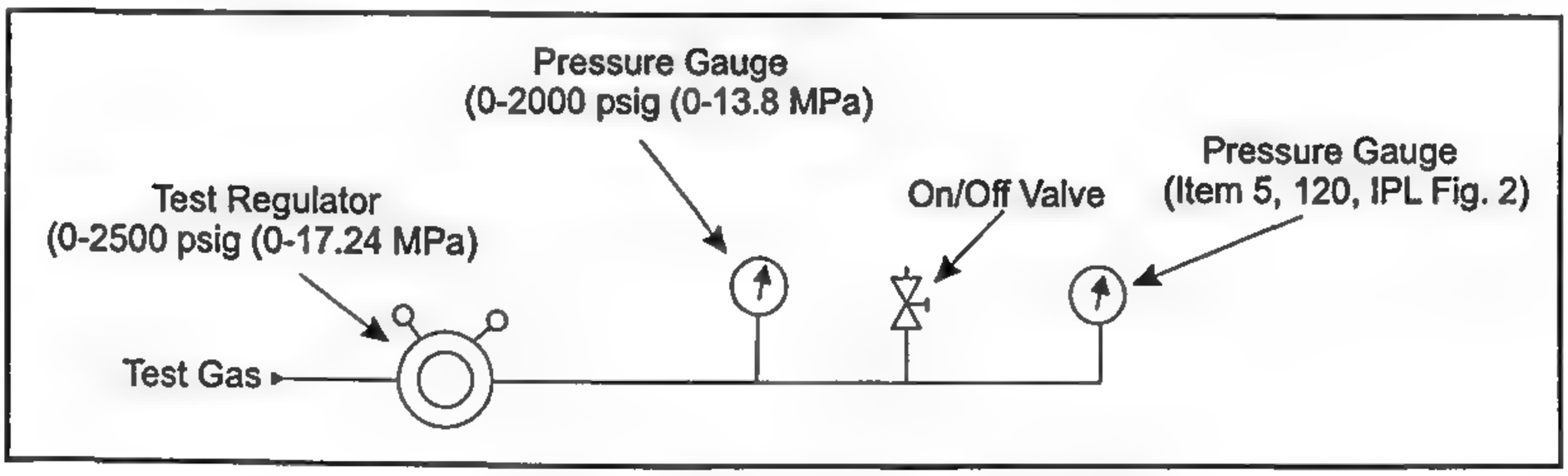
      Refer to Figure 111.

      A pressure gauge which does not pass the following test must be replaced.

      (1) Attach pressure gauge (5, 120) to regulated oxygen source as shown in Figure 111.

      (2) Apply 1800 psig (12.41 MPa) to the test system, as indicated on 0 - 2000 psig (0 - 13.79 MPa) test system Pressure Gauge (Table 101). The pressure indicated on pressure gauge (5, 120) must be within ± 100 psig (± 0.69 MPa) of pressure on test system Pressure Gauge.

      (3) Reduce inlet pressure of test system to 0 psig (0 MPa) and remove pressure gauge (5, 120) from test setup.



Pressure Gauge Accuracy Test Setup
Figure 111

6. Fault Isolation

Refer to Table 106 for troubleshooting problems, causes and solutions. Refer to IPL Figure 2 for item numbers, except as noted otherwise.

Table 106
Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	SOLUTION
A. REGULATOR FUNCTIONAL TEST (PARA. 4.B.) AND REGULATOR FLOW TEST (PARA. 4.C.)		
Regulator (10 thru -20H, IPL Fig. 1) does not have correct outlet pressure or correct outlet flow.	Worn or binding toggle assembly (-135) on regulators (20 thru -20H, IPL Fig. 1).	Replace toggle or toggle shaft
	Worn or binding lever assembly (-165) on regulators (10 thru -10C, IPL Fig. 1).	Replace lever.
		Replace lever bushings.
		Retorque screws.
	Plugged or contaminated filter (340).	Replace filter.
	Binding or damaged actuation pin (310).	Lubricate or replace actuation pin.
	Worn or damaged seal housing assembly (325).	Replace seal housing assembly .
	Damaged spring (300).	Replace spring.
	Damaged or binding poppet (260).	Replace poppet.
	Defective seat (350).	Replace seat.
	Damaged, incorrectly installed or non-lubricated piston seal (280).	Lubricate, reposition or replace piston seal.
	Damaged regulating piston (265).	Replace regulating piston.
	Damaged reference force spring (250).	Replace reference force spring.
	Regulator in "lockup" condition (obstruction in outlet line downstream of regulator outlet).	Remove downstream obstruction.
	Worn or damaged preformed packing (270, 320).	Replace preformed packings.

Table 106 (Continued)
Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	SOLUTION
TOGGLE OPERATION TEST (PARA. 4.D.)		
Regulator (20 thru -20H, IPL Fig. 1) toggle assembly will not shut off oxygen flow or vent oxygen from the regulator.	Worn or binding toggle assembly (-135).	Replace toggle.
		Replace toggle shaft.
	Binding or damaged actuation pin (310).	Lubricate or replace actuation pin.
LEVER OPERATION TEST (PARA. 4.E.)		
Regulator (10 thru -10C, IPL Fig. 1) lever assembly will not shut off oxygen flow or vent oxygen from the regulator.	Worn or binding lever assembly (-165).	Replace lever.
		Replace lever bushings.
		Retorque fillister head screws.
	Binding or damaged actuation pin (310).	Lubricate or replace actuation pin.
LEVER ARM ACTUATION FORCE TEST (PARA. 4.F.)		
Force required to move lever assembly (-165) to the full "on" or "off" positions is too high.	Worn or binding lever assembly (-165).	Replace lever.
		Replace lever bushings.
		Retorque fillister head screws.
	Binding or damaged actuation pin (310).	Lubricate or replace actuation pin.
REGULATOR INTERNAL LEAKAGE TEST (PARA. 4.G.)		
Measured leakage exceeds maximum allowable.	Worn or damaged seat (350).	Replace seat.
	Worn or damaged preformed packing (355).	Replace preformed packing.
	Damaged or binding poppet (260).	Replace poppet.
	Damaged spring (300).	Replace spring.
	Binding or damaged actuation pin (310).	Lubricate or replace actuation pin.

Table 106 (Continued)
Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	SOLUTION
REGULATOR EXTERNAL LEAKAGE TEST (PARA. 4.H.)		
Connection between pressure gauge (120), filler valve assembly (100, 100B), pipe fitting (115) and branch tee fitting (115A) leaks.	Part does not have correct seal using thread sealing tape.	Disassemble and reassemble part that leaks to pipe fitting.
	Threads damaged.	Replace damaged part.
	Part not tight in pipe fitting or branch tee fitting.	Retorque part.
Connection between pipe fitting (115), branch tee fitting (115A), filler valve assembly (80, 100A), or relief valve (65, -65A) and body (360, -360A) leaks.	Part does not have correct seal using thread sealing tape.	Disassemble and reassemble part that leaks to body.
	Threads damaged.	Replace damaged part
	Part not tight in body.	Retorque part.
Leakage at vent hole in side of housing assembly (240).	Damaged, incorrectly installed or non-lubricated piston seal (280).	Lubricate, reposition or replace piston seal.
	Worn or damaged preformed packing (270).	Replace preformed packing.
Leakage past housing assembly (240) near actuation pin (310).	Worn or damaged seal housing assembly (325).	Replace seal housing assembly.
	Worn or damaged preformed packing (320).	Replace preformed packing.
Connection between pressure gauge (5), pressure transducer (10), flareless tube plug (420), or filler valve assembly (-420A) and body (360, -360A) leaks.	Part does not have correct seal with preformed packing (15, 405).	Disassemble and reassemble part that leaks to body.
	Worn or damaged preformed packing (15, 405).	Replace preformed packing.
	Part not tight in body.	Retorque part.
Connection between pressure transducer (385) and 90° male/female elbow (400) leaks.	Worn, damaged or missing metal boss seal (395).	Replace metal boss seal.
	Threads damaged.	Replace pressure transducer or 90° male/female elbow.
	Transducer not tight in elbow.	Retorque transducer.

Table 106 (Continued)
Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	SOLUTION
REGULATOR EXTERNAL LEAKAGE TEST (PARA. 4.H.) (Continued)		
Connection between 90° male/female elbow (400), tube nut (415) or packing backup retainer (410) and regulator body (360, -360A) leaks.	Missing packing backup retainer (410) or incorrect parts assembly order.	Disassemble and reassemble parts that leak at body.
	Worn or damaged preformed packing (405).	Replace preformed packing.
	Tube nut (415) not tight against regulator body (360, -360A).	Retorque transducer.
Connection between burst disc spacer (50) and body (360, -360A) leaks.	Missing safety plug washer (60) or damaged safety disc (55, -55A).	Replace safety disc or safety plug washer.
	Threads damaged.	Replace damaged part.
	Burst disc spacer (50) not tight in body.	Retorque burst disc spacer.
Connection between male connector (20, 30), flareless tube plug (-20A) or threaded reducer (-30A, -30B) and regulator body (360, -360A) leaks.	Part does not have correct seal with preformed packing (25, 35).	Disassemble and reassemble part that leak to body.
	Worn or damaged preformed packing (25, 35).	Replace preformed packings.
	Part not tight in body.	Retorque part.
Connection between regulator assembly (10, -10A, 20 thru -20D, -20G, -20H IPL Fig. 1) and cylinder assembly (30 thru -30D, IPL Fig. 1) leaks.	Parts do not have correct seal with metal boss seal (365).	Disassemble and reassemble parts.
	Worn or damaged metal boss seal (365).	Replace metal boss seal.
	Regulator not tight in cylinder.	Retorque regulator.
Connection between regulator assembly (-10B, -10C, -20E, -20F, IPL Fig. 1) and cylinder assembly (-40 thru -40E, IPL Fig. 1) leaks.	Parts do not have correct seal with thread sealing tape.	Disassemble and reassemble parts.
	Threads damaged.	Replace damaged part.
	Regulator not tight in cylinder.	Retorque regulator.

Table 106 (Continued)
Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	SOLUTION
REGULATOR EXTERNAL LEAKAGE TEST (PARA. 4.H.) (Continued)		
Leakage past valve core (-85, -105, -430) of filler valve assembly (80, 100, -420A).	Worn or damaged valve core (-85, -105, -430) or body (-90, -110, -425).	Replace valve core or body.
	Valve core not tight in body.	Retorque valve core.
Relief valve (65, -65A) leaking.	Damaged relief valve (65, -65A).	Replace relief valve.
PRESSURE/TEMPERATURE TRANSDUCER TEST (PARA. 5.A.)		
Pressure/Temperature transducer (385) accuracy is out of limits.	Damaged or defective pressure/temperature transducer (385).	Replace pressure/temperature transducer.
RELIEF VALVE PRESSURE TEST (PARA. 5.B.)		
Relief valve (65, -65A) operation pressure range is out of limits.	Damaged or malfunctioning relief valve (-65, -65A).	Replace relief valve.
PRESSURE GAUGE ACCURACY TEST (PARA. 5.C.)		
Pressure gauge (5, 120) indicated pressure is incorrect.	Damaged, obstructed or malfunctioning pressure gauge (5, 120).	Replace pressure gauge.

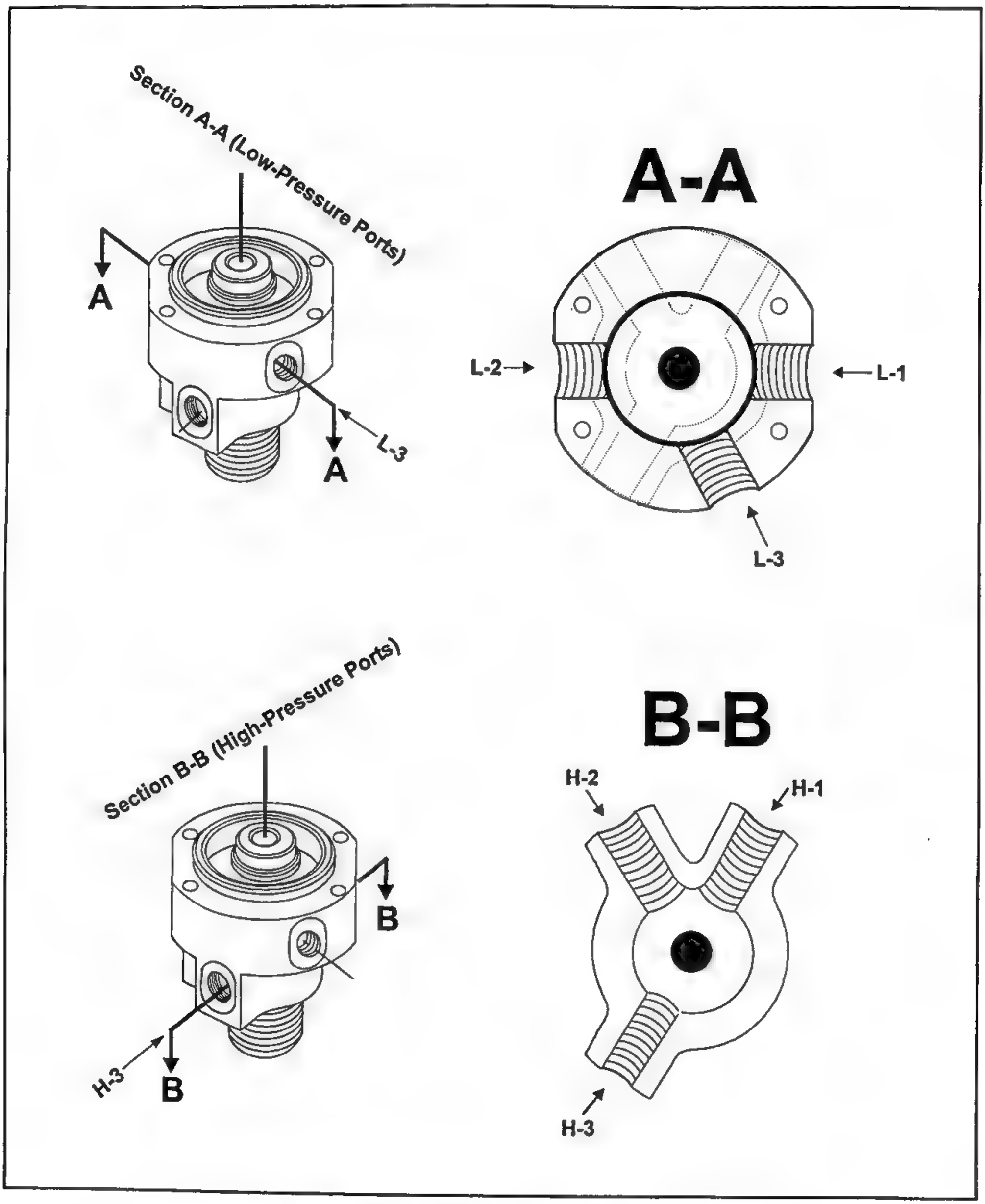
DISASSEMBLY

1. General

This section describes the equipment and procedures necessary to disassemble the 898 Series Cylinder and Regulator Assembly (CRA). Most repair procedures do not need complete disassembly of the CRA. Disassemble units only to level necessary, as determined in TESTING AND FAULT ISOLATION section, to repair or replace components. Disassembly is organized as follows.

Paragraph	Description	IPL Figure No.
3.A.	Regulator Port Device Removal and Disassembly	2
3.B.	Cylinder and Regulator	1, 2, 3
3.C.	Lever-Operated Regulator	2
3.D.	Toggle-Operated Regulator	2
3.E.	General Regulator Disassembly	2

Regulators (10 thru -10C, 20 thru -20H, IPL Fig. 1) contain three high pressure ports and three low pressure ports. High pressure ports (H-1, H-2, H-3) are located near the base section (closest to the cylinder). Low pressure ports (L-1, L-2, L-3) are located near the attached regulator housing (240, IPL Fig. 2). Refer to Fig. 301 to locate ports.



Regulator Body Port Locations
(Top View w/ Housing and All Internal Parts Removed)
Figure 301

2. Special Tools, Fixtures and Test Equipment

A list of special tools, fixtures and test equipment necessary for disassembly of the 898 Series CRA is shown in Table 301. Fig. No. information provided in the "NOMENCLATURE" column correspond to the tool listing in Table 901 of the SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT section. Unless otherwise noted, one of each item listed is required. Equivalent tools, fixtures and test equipment may be substituted

Table 301
Special Tools, Fixtures and Test Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ Vendor Code)
Offset Spanner Wrench (½ in. Drive) (Fig. 901)	898940-S91-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Regulator Assembly Fixture (Fig. 902)	898940-S50-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Adapter (Fixed) (Part of Fig. 902)	898940-S57-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Adapter (Slip On) (Part of Fig. 902)	898940-S57-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Regulator Clamp Adapter (Fig. 903)	898940-S57-3	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Cylinder/Valve Wrench (Fig. 904)	800216-T91-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Disc Drive Set (Fig. 905)	803949-S52-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Nesting Plate (Fig. 906)	803949-S57-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Pneumatic Bench Vise	Model BV-101-P P/N 58634	Getz Fire Equipment Peoria, IL 61602-1711 USA (V58013)
Plastic Rod	0.250 (6.35 mm) Diameter x 5 in. (13 cm) Length	Local Vendor

3. Disassembly

This section gives details for the disassembly of the 898 Series CRA. Unless specified, all disassembly procedures apply equally to both the lever-operated regulator and toggle-operated regulator assemblies. Also, unless otherwise noted, all disassembly procedures requiring turning, twisting or un-threading will be in the counterclockwise direction.

WARNING: FAILURE TO FULLY DISCHARGE THE CRA OF OXYGEN PRIOR TO DISASSEMBLY OF ANY PART MAY CAUSE SERIOUS PERSONAL INJURY OR DEATH.

FAILURE TO USE SUITABLE EYE PROTECTION DURING DISASSEMBLY PROCEDURES MAY CAUSE INJURY TO THE EYES.

FAILURE TO SECURE CYLINDER, REGULATOR ASSEMBLY AND ATTACHED HOSE DURING OXYGEN DISCHARGE MAY CAUSE SERIOUS PERSONAL INJURY OR DEATH.

Attach a discharge hose to low-pressure port L-1 or L-2. Slowly set the regulator toggle assembly (-135, IPL Fig. 2) or lever assembly (-165, IPL Fig 2) to the "ON" position. Release all the oxygen from the Cylinder and Regulator Assembly through the discharge hose to a well ventilated area.

A. Regulator Port Device Removal and Disassembly

Unless otherwise noted, refer to IPL Fig. 2 for items specified in paragraphs 3. A.(1) thru 3.A.(6). Also, Fig. 301 will help with the identification of ports H1 thru H3 and L1 thru L3.

Remove protective bands (60 thru -60C, IPL Fig. 1) from cylinder assembly (30 thru -30D, IPL Fig.1).

CAUTION: FAILURE TO HOLD THE CRA IN A PNEUMATIC BENCH VISE DURING DISASSEMBLY MAY CAUSE DAMAGE TO THE FIBER-OVERWRAP ON COMPOSITE CYLINDERS.

DO NOT DISASSEMBLE THE PRESSURE GAUGE OR TEMP/ PRESSURE TRANSDUCER COMPONENTS OR PERMANENT DAMAGE MAY OCCUR.

Place the CRA in a Pneumatic Bench Vise (Table 301) for removal of items attached at ports H1 thru H3 and L1 thru L3.

(1) H-1 Port Devices

(a) Remove and discard lockwire between adapter fitting (40) or male altered-connector (-40A) and cap screw (245).

(b) Unthread adapter fitting (40) and remove from regulator body (360, -360A). Remove burst disc catcher (-45) from regulator body.

3. Disassembly (Continued)

A. Regulator Port Device Removal and Disassembly (Continued)

(1) H-1 Port Devices (Continued)

(c) Unthread male altered-connector (-40A) and remove from regulator body (360, -360A).

(d) Unthread burst disc spacer (50) and remove from regulator body (360, -360A).

(e) Remove and discard safety disc (55, -55A) from regulator body (360, -360A).

(f) Remove safety plug washer (60) from regulator body (360, -360A).

(2) H-2 Port Devices

(a) Unthread pressure gauge (5) from regulator body (360, -360A). Remove and discard preformed packing (15) from gauge.

(b) Unthread pressure transducer (10) from regulator body (360, -360A). Remove and discard preformed packing (15) from pressure transducer.

(c) Unthread flareless tube plug (420) from regulator body (360, -360A). Remove and discard preformed packing (405).

(d) Unthread filler valve assembly (-420A) from regulator body (360, -360A). Remove and discard preformed packing (405). Unthread valve core (-430) from valve body (-425) using Cylinder/Valve Wench (Table 301).

(e) Remove and discard lockwire between charging valve assembly (-460) and cap screw (245). Unthread charging valve assembly (-460) from regulator body (360, -360A). Remove and discard preformed packing (405). Unthread valve core (465) from valve body (470) using Cylinder/Valve Wrench (Table 301).

(f) Remove pan head screw (-380) and self-locking nut (-375) that attach regulator clamp (370) to transducer clamp (390). Remove transducer clamp from temperature/pressure transducer (385). Discard self-locking nut.

(g) Remove pan head screw (-380) and self-locking nut (-375) that attach regulator clamp (370) to housing assembly (240). Remove regulator clamp from housing. Discard self-locking nut.

(h) Unthread temperature/pressure transducer (385) from male/female 90° elbow (400). Remove and discard metal boss seal (395).

(j) Unthread male/female 90° elbow (400) from regulator body (360, -360A). Remove and discard preformed packing (405). Remove packing backup retainer (410) and unthread tube nut (415) from elbow.

3. Disassembly (Continued)

A. Regulator Port Device Removal and Disassembly (Continued)

(3) H-3 Port Devices

(a) Unthread filler valve assembly (80) from regulator body (360, -360A). Unthread cap assembly (75) from filler valve assembly (80). Unthread valve core (-85) from body (-90) using Cylinder/Valve Wrench (Table 301).

(b) Unthread filler valve assembly (100A) from regulator body (360, -360). Unthread valve core (-105) from valve body (-110) using Cylinder/Valve Wrench (Table 301).

(c) Unthread pipe fitting (115) containing pressure gauge (120), filler valve assembly (100) and cap and chain assembly (125) from regulator body (360, -360A).

(d) Remove and discard filter screen (-70) from regulator body (360, -360A).

(e) Unthread cap and chain assembly (125) from filler valve assembly (100B). Unthread valve core (-105) from body (-110) using Cylinder/Valve Wrench (Table 301). Unthread body (-110) from pipe fitting (115) or branch tee fitting (115A). Remove cap and chain assembly from body. Keep ring (130) attached to the cap and chain assembly.

(f) Unthread pressure gauge (120) from pipe fitting (115) or branch tee fitting (115A).

(4) L-1 Port Devices

(a) Remove and discard lockwire between male altered-connector (30) and cap screw (245). Unthread male altered-connector (30) from regulator body (360, -360A). Remove and discard preformed packing (35) from male altered-connector.

(b) Unthread external thread reducer (-30A, -30B) from regulator body (360, -360A). Remove and discard preformed packing (35) from external thread reducer.

(5) L-2 Port Devices

(a) Unthread male connector (20) from regulator body (360, -360A). Remove and discard preformed packing (25) from male connector.

(b) Remove and discard lockwire between flareless tube plug (20A) and cap screw (245). Unthread flareless tube plug (20A) from regulator body (360, -360A). Remove and discard preformed packing (25) from flareless tube plug.

(6) L-3 Port Devices

(a) Unthread pressure relief valve assembly (65) or overboard-vent relief valve (-65A) from regulator body (360, -360A).

3. Disassembly (Continued)

B. Cylinder and Regulator

Refer to IPL Figures 1, 2 and 3.

CAUTION: FAILURE TO HOLD THE CRA IN A PNEUMATIC BENCH VISE DURING DISASSEMBLY MAY CAUSE DAMAGE TO THE FIBER-OVERWRAP ON COMPOSITE CYLINDERS.

(1) Using Offset Spanner Wrench (Table 301) unthread regulator assembly (10 thru -20H, IPL Fig. 1) from cylinder assembly (30 thru -40E, IPL Fig. 1).

(2) Remove and discard metal boss seal (365, IPL Fig. 2) from regulator assembly (-1, -1A, -1D thru -1H, -1L, -1M, IPL Fig. 2).

NOTE: Metal boss seal (365, IPL Fig. 2) is only used with straight thread (0.750 - 16 UNF) regulator bodies that attach to composite cylinders (30 thru -30D, IPL Fig. 1).

(3) Remove warning labels (30, 40, 50, IPL Fig. 3) and identification plate (50, IPL Fig.1) only if damaged.

NOTE: All cylinder hydro-retest labels (15, IPL Fig. 3) on composite style cylinders (10 thru -10D, IPL Fig. 3) must not be removed.

C. Lever-Operated Regulator

This paragraph is for use only with lever-operated regulators (10 thru -10C, IPL Fig.1).

Unless otherwise noted, refer to IPL Fig. 2.

(1) Remove push-pull label (445) on cable bracket (230) only if damaged.

(2) Remove fillister head screws (170), flat washers (175, 180) and lever bushings (185) that attach lever assembly (-165) to housing assembly (240).

(3) Remove retaining ring (195) and flat washer (200) that hold straight pin (190) in lever (205). Remove straight pin from lever.

(4) Remove cone-point setscrews (215) that attach harness bracket assembly (-210) to housing assembly (240). Remove harness bracket assembly from housing assembly.

(5) Remove screw (235) from insert assembly (220). Remove retaining ring (225) from insert assembly. Remove insert assembly from cable bracket (230).

3. Disassembly (Continued)

D. Toggle-Operated Regulator

This paragraph is for use only with toggle-operated regulators (20 thru -20H, IPL Fig. 1).

Unless otherwise noted, refer to IPL Fig. 2.

(1) Remove labels (435, 440) on toggle assembly (-135) only if damaged.

(2) Remove pan head screws (140) that attach toggle assembly (-135) and toggle filler (160) to housing assembly (240). Remove toggle assembly and toggle filler from housing assembly.

(3) Unthread toggle shaft (150) from housing assembly (155). Remove toggle (145) from housing assembly.

E. General Regulator Disassembly

Unless otherwise noted, refer to IPL Fig. 2.

WARNING: FAILURE TO SECURE A REGULATOR IN THE OXYGEN REGULATOR ASSEMBLY FIXTURE WITH OXYGEN REGULATOR CLAMP ADAPTER DURING DISASSEMBLY MAY RESULT IN SERIOUS PERSONAL INJURY BECAUSE A SPRING LOCATED BETWEEN HOUSING ASSEMBLY AND BODY ASSEMBLY EXERTS 70-80 POUNDS (311-356 N) OF FORCE.

(1) Install regulator assembly in Oxygen Regulator Assembly Fixture (Table 301) with Oxygen Regulator Clamp Adapter (Table 301) attached. Remove four cap screws (245).

WARNING: FAILURE TO HOLD REGULATOR ASSEMBLY TIGHT IN OXYGEN REGULATOR ASSEMBLY FIXTURE AS THE FIXTURE CLAMP IS SLOWLY RELEASED MAY RESULT IN SERIOUS PERSONAL INJURY BECAUSE OF PARTS BEING EJECTED BY SPRING FORCE BETWEEN HOUSING ASSEMBLY AND BODY ASSEMBLY.

(2) Separate housing assembly (240) from body assembly (-330, -330A) by slowly releasing clamp on Oxygen Regulator Assembly Fixture (Table 301).

(3) Remove reference force spring (250) and shims (255, -255A) from housing assembly (240).

CAUTION: FAILURE TO USE THE SAME NUMBER AND THICKNESS OF SHIMS DURING REASSEMBLY MAY CAUSE THE REGULATOR TO FUNCTION IMPROPERLY.

(4) Remove poppet (260) from regulating piston (265).

3. Disassembly (Continued)

E. General Regulator Disassembly (Continued)

(5) Remove regulating piston (265) and spring assembly (-285) from housing assembly (240).

(6) Remove preformed packing (270), retaining ring (275) and piston seal (280). Discard preformed packing and piston seal.

CAUTION: FAILURE TO USE THE NESTING PLATE AND DISC DRIVE SET DURING DISASSEMBLY OF THE SPRING ASSEMBLY MAY CAUSE DAMAGE TO, OR LOSS OF, PARTS FROM THE SPRING ASSEMBLY WHEN CAP IS UNTHREADED FROM RETAINER.

(7) Install spring assembly (-285) in Nesting Plate (Table 301). Apply downward force on cap (290), while using Disc Drive Set (Table 301) to unthread cap (290) from retainer (295).

(8) Remove spring (300) and disc (305) from retainer (295).

(9) Remove seal housing assembly (325), actuation pin shim (315) and actuation pin (310) from housing (240). Discard both the seal housing assembly (325) and attached preformed packing (320).

(10) Remove warning label (450) and identification plate (455) on housing (240) only if damaged.

(11) Position regulator body (360, -360A) in a vise, or other clamping fixture, so that external threads (cylinder mating) on base of regulator body are in the up direction.

(12) Unthread tube assembly (335) from regulator body (360, -360A). Discard tube assembly.

(13) Remove filter (340) and spacer (345) from regulator body (360, -360A). Discard filter.

(14) Position regulator body (360, -360A) in vise, or other clamping fixture, so that the external threads on base of body are placed in the down direction.

(15) Put a 0.250 in. (6.35 mm) diameter Plastic Rod (Table 301) (approximately 5 in. (13 cm) long) in top-center hole of regulator body (360, -360A) so that it touches regulator seat (350). Lightly hit Plastic Rod with a small hammer to loosen seat (350) with attached preformed packing (355) from regulator body. Remove and discard seat and attached preformed packing.

CLEANING

1. General

This section contains information about the equipment and the procedures for cleaning the 898 Series Cylinder and Regulator Assembly (CRA). Before cleaning, the CRA shall be disassembled using procedures in the DISASSEMBLY section of this manual.

2. Safety

WARNING: FAILURE TO USE SUITABLE SKIN AND EYE PROTECTION DURING CLEANING PROCEDURES MAY CAUSE SERIOUS PERSONAL INJURY.

FAILURE TO USE SOLVENTS ONLY IN WELL VENTILATED AREAS, AWAY FROM HIGH HEAT OR OPEN FLAMES, MAY CAUSE SERIOUS PERSONAL INJURY, FIRE OR EXPLOSION.

DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. DUST, LINT, AND FINE METAL PARTICLES ARE ALSO POTENTIAL COMBUSTIBLES THAT CAN IGNITE, AND RESULT IN EXPLOSION OR FIRE, WHEN EXPOSED TO PRESSURIZED OXYGEN.

REFER TO AND FOLLOW APPLICABLE MANUFACTURER'S OR SUPPLIER'S MATERIAL SAFETY DATA SHEET (MSDS) WHEN USING CLEANING MATERIALS SPECIFIED IN THIS SECTION OR SERIOUS PERSONAL INJURY MAY OCCUR.

3. Reference Documents

A list of applicable reference documents are given in Table 401.

Table 401
Reference Documents

DOCUMENT NUMBER	DOCUMENT NAME	ORDERING INFORMATION
RR-C-901C	Cylinders, Compressed Gas: High Pressure, Steel DOT 3AA, and Aluminum Application, General Specification for:	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)
MIL-STD-1359B	Military Standard Cleaning Methods and Procedures for Breathing Oxygen Equipment	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)

Table 401 (Continued)
Reference Documents

DOCUMENT NUMBER	DOCUMENT NAME	ORDERING INFORMATION
MIL-D-16791G	Military Specification Detergents, General Purpose, (Liquid, Non-ionic)	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)

4. Special Tools, Fixtures and Equipment

A list of special tools, fixtures and equipment necessary for cleaning of the 898 Series CRA is shown in Table 402. Unless otherwise noted, one of each item listed is required. Equivalent tools, fixtures and equipment may be substituted.

Table 402
Special Tools, Fixtures and Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Protective Cap 1.188 in. (3.018 cm) ID 1.125 in. (2.858 cm) ID 1.250 in. (3.175 cm) ID	 C234 C336 C340	Alliance Plastics Inc. Erie, PA 16510-3045 USA (V34669)
Liquid/Vapor Degreaser System	MSR-216LE	Baron Blakeslee Long Beach, CA 90813 USA (V0FDJ7)
Ultrasonic Cleaning System	TH1418-9	Mass Technology PO Box 795-T East Moline, IL 61244-0795 USA Fax: 309-755-1121
Stainless Steel Tubing	0.250 in (6.35 mm) OD x 0.035 in (0.889 mm) wall **or** 0.375 in (9.53 mm) OD x 0.035 in (0.889 mm) wall	Local Vendor
Wire Brush	1.5 in (3.8 cm) Diameter	Local Vendor

5. Cleaning Materials

A list of consumable materials is given in Table 403. National and International environmental agreements may quickly limit the use of some cleaning materials. Equivalent cleaning materials may be used.

Table 403
Consumable Materials

MATERIAL	DESCRIPTION	MANUFACTURER (w/ VENDOR CODE)
Non-ionic Detergent	Non-ionic Detergent, Type I (MIL-D-16791G)	Local Vendor
Degreasing Agent	Genesolv 2000 (1,1-Dichloro-1-fluoroethane)	Allied Signal Corp. Morristown, NJ 07960 USA (V70308)
Neutralizing & Deodorizing Agent	Versadet	Oakite Products Berkeley Heights, NJ 07922-2712 USA (V44389)
Ceramic Tumbling Media	"XA" Ceramic Media (30 Mesh)	Washington Mills Co. North Grafton, MA 01536-1558 USA (V89204)
Glass Tumbling Media	Ballotini Impact Beads	Potters Industries (PQ Corp.) Valley Forge, PA 19482-0840 USA (V08867)

6. Cylinder Cleaning

The 898 Series CRA uses two different types of cylinders to store oxygen. External cleaning and general internal cleaning procedures are the same for both types of cylinders used with the 898 Series CRA. If corrosion or odor is present on the inside of the cylinder, specific internal cleaning procedures must be followed.

A. External Cleaning

(1) Seal the opening at the neck of the cylinder using a Protective Cap (Table 402) applicable to the cylinder being cleaned.

(2) Prepare a 1% non-ionic detergent solution by mixing approximately 1.5 oz. (40 cc) of Non-ionic Detergent (Table 403) into 1 gallon (4 liters) of clean water.

(3) Clean the outside of the cylinder using a soft-bristled brush and a clean, hot (104-140 °F, 40-60 °C) 1% solution of non-ionic detergent and water.

(4) Rinse the outside of the cylinder using clean water.

(5) Dry the outside of the cylinder with clean, dry, oil-free air.

(6) Remove Protective Cap from cylinder opening.

6. Cylinder Cleaning (Continued)

B. General Internal Cleaning

CAUTION: THE NECK AND THREADED AREA OF COMPOSITE CYLINDERS MUST NOT BE CLEANED USING ANY ABRASIVE ACTION OR ABRASIVE MATERIAL, INCLUDING WIRE BRUSHES OR ABRASIVE PRODUCTS, OR DAMAGE TO SEALING SURFACES OR THREADS MAY OCCUR.

(1) Clean the neck and threads of the steel cylinder (-40 thru -40E, IPL Fig. 1) with a Wire Brush (Table 402), as needed.

(2) Shake out any unwanted material from inside the cylinder.

(3) Set the cylinder into a Liquid/Vapor Degreaser System (Table 402) as shown in Fig. 401.

(4) Use the Stainless Steel Tubing (Table 402) and clean the inside of the cylinder with warm (65-80 °F, 18-27 °C) Degreasing Agent (Table 403) for 3 minutes. Adjust the flow rate of the Degreasing Agent to produce a fluid pressure equal to 6-8 feet (1.8 to 2.4 meters) of head per cleaning station.

NOTE: The length and diameter of the Stainless Steel Tubing is a function of the size of the cylinder.

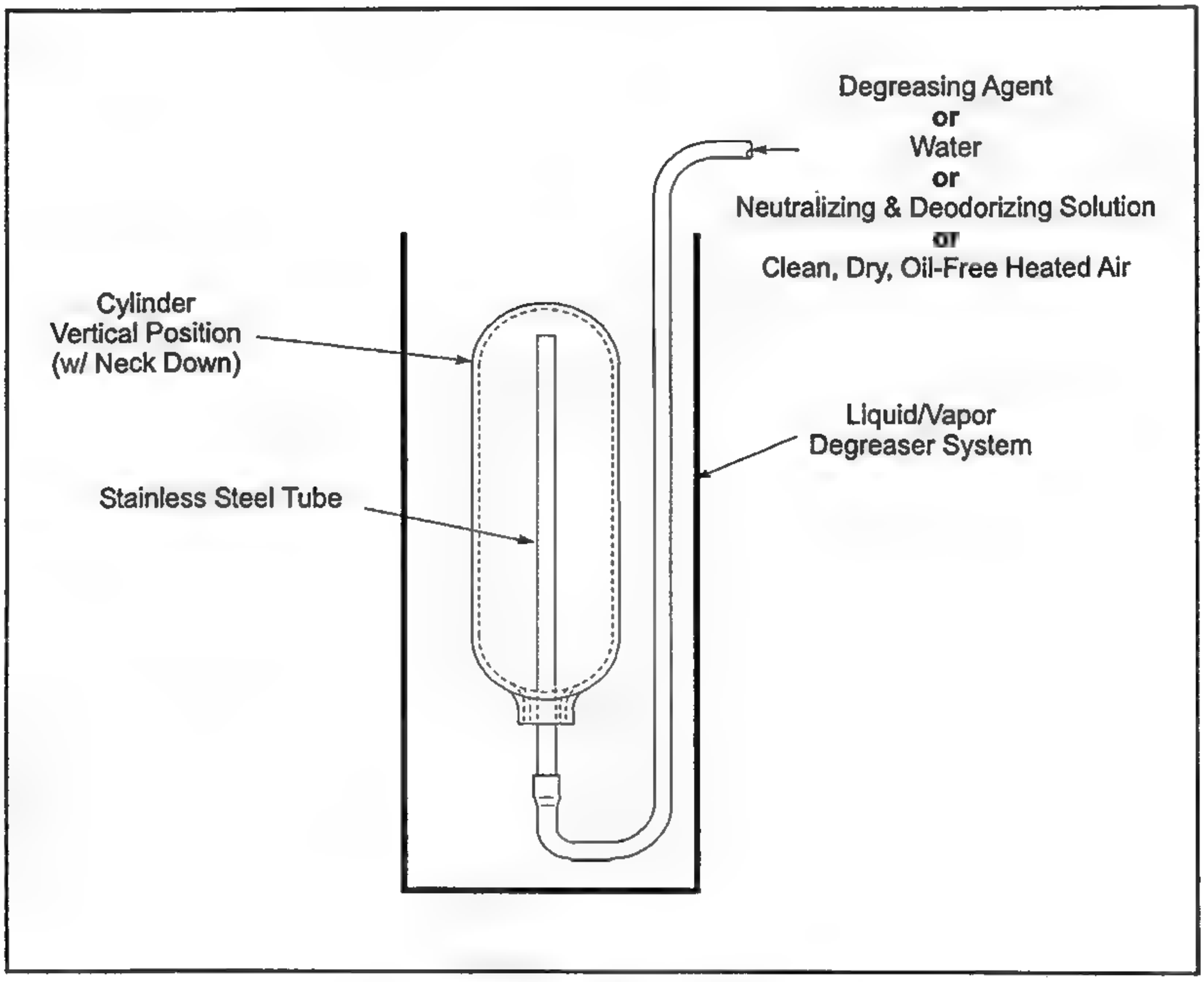
(5) Let the Degreasing Agent drain from the cylinder for one minute.

(6) Dry the cylinder with clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C). Flow air through a 0.250 in. (6.35 mm) OD Stainless Steel Tubing for one minute, using approximately 12.5 psig (0.086 MPa) air pressure.

(7) Remove cylinder from cleaning setup and allow it to cool to room temperature.

(8) Make sure that the cylinder is cleaned to General Specification RR-C-901C (Table 401), except that hydrocarbon contamination of the cylinder must not be more than 1.0 mg per square foot of the surface area cleaned.

(9) Make sure that the inside of the cylinder does not have an odor or contamination. If the cylinder has an odor or contamination, perform the following specific cylinder internal cleaning procedures for a steel cylinder or a composite cylinder.



Cylinder Internal Cleaning Setup
Figure 401

6. Cylinder Cleaning (Continued)

C. Steel Cylinder Internal Cleaning

Perform this operation only if signs of corrosion (including large amounts of irregular shaped materials on the inner cylinder surface) or an odor is present inside of steel cylinders (-40 thru -40E, IPL Fig. 1).

(1) Refer to Table 404 to determine the amount of small (approximately 30 mesh) Ceramic Tumbling Media (Table 403) required for corrosion removal.

(2) Fill cylinder with correct amount of Ceramic Tumbling Media determined from Table 404. Cover cylinder opening with Protective Cap (Table 402). Shake and turn (at the same time) the media filled cylinder 20 times by hand. Remove Protective Cap and remove media from cylinder.

Table 404
Cylinder Media Requirements

CYLINDER CAPACITY	MEDIA REQUIRED
ft^3 (liters)	lbs (gm)
4-11 (113-312)	0.5 (227)
22-49 (623-1388)	0.75 (340)
63-115 (1784-3257)	1.0 (454)

6. Cylinder Cleaning (Continued)

C. Steel Cylinder Internal Cleaning (Continued)

(3) Prepare a neutralizing & deodorizing solution by mixing approximately 60 grams of Neutralizing & Deodorizing Agent (Table 403) per gallon (4.0 liters) of clean water.

(4) Set the cylinder into the Liquid/Vapor Degreasing System (Table 402) and flush the cylinder with heated (160-190 °F, 71-88 °C) neutralizing & deodorizing solution through the Stainless Steel Tubing (Table 402) for five minutes minimum. Adjust the flow rate of solution to produce a fluid pressure equal to 6 - 8 feet (1.8 - 2.4 meters) of head per cleaning station.

(5) Flush the cylinder with clean, heated (160-190 °F, 71-88 °C) water through the Stainless Steel Tubing for two minutes minimum. The flow rate for the heated water must be a minimum of 1.2 gallons (4.5 liters) per minute per station.

(6) Let the water drain completely from the cylinder.

(7) Dry the cylinder with clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C). Flow air through the 0.250 in. (6.35 mm) OD Stainless Steel Tubing for four minutes minimum. Set the air pressure at 12.5 psig (0.086 MPa).

(8) Cool the cylinder with clean, dry, oil-free air (65-75 °F, 18-24 °C) through the 0.250 in. (6.35 mm) OD Stainless Steel Tubing for four minutes. Set the air pressure at 12.5 psig (0.086 MPa).

(9) The inside of the cylinder must be completely dry.

D. Composite Cylinder Internal Cleaning

Perform this operation only if signs of corrosion (including large amounts of irregular shaped deposits on the inner cylinder surface) or odor are present inside of composite cylinders (30 thru -30D, IPL Fig. 1).

(1) Use Table 404 to determine the amount of Glass Tumbling Media (Table 403) required for corrosion removal.

6. Cylinder Cleaning (Continued)

D. Composite Cylinder Internal Cleaning (Continued)

(2) Fill cylinder with correct amount of Glass Tumbling Media (Table 403). Cover cylinder opening with Protective Cap (Table 402). Shake and turn (at the same time) by hand the media filled cylinder for approximately 3 to 5 minutes. Remove Protective Cap from cylinder.

(3) Empty Glass Tumbling Media from cylinder.

(4) Set the cylinder into a Liquid/Vapor Degreasing System (Table 402) as shown in Fig. 401.

(5) Flush the cylinder with clean, heated (160-190 °F, 71-88 °C) water through the Stainless Steel Tubing (Table 402) for two minutes minimum. The flow rate for the heated water must be a minimum of 1.2 gallons (4.5 liters) per minute per station.

(6) Let the water drain completely from the cylinder.

(7) Dry the cylinder with clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C). Flow air through the 0.250 in. (6.35 mm) OD Stainless Steel Tubing for four minutes minimum. Set the air pressure at 12.5 psig (0.086 MPa).

(8) The inside of the cylinder must be completely dry

7. Metal Components

Make sure that all metallic components in direct contact with oxygen are cleaned to a maximum of 1 milligram of particulates per square foot of exposed surface (MIL-STD-1359B (Table 401)).

Clean metal components using a Liquid/Vapor Degreaser System (Table 402) with Degreasing Agent (Table 403). Immerse parts in Degreaser Agent for 4 minutes followed by vapor rinse for 2 - 5 minutes. Slowly remove parts from vapor rinse and allow them to cool and dry in a clean work area.

Do not clean used filters (-70, 340, IPL Fig. 2), metal-boss seals (365, 395, IPL Fig. 2) or safety discs (55, -55A, IPL Fig. 2). These items must be replaced each time they are removed for disassembly.

8. Non-Metallic Components

Make sure that all non-metallic components in direct contact with oxygen are cleaned to a maximum of 1 milligram of particulates per square foot of exposed surface (MIL-STD-1359B (Table 401)).

Prepare 1% non-ionic detergent and water solution according by mixing approximately 1.5 oz. (40 cc) of Non-ionic Detergent (Table 403) in 1 gallon (4 liters) of clean water. Using the non-ionic detergent cleaning solution clean non-metallic components in an Ultrasonic Cleaning System (Table 402) for approximately 3 to 5 minutes. Rinse cleaned parts with clear, warm (85-95 °F, 29-35 °C) water. Dry parts using clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C).

Do not clean used preformed packings (15, 25, 35, 270, 320, 355, 405, IPL Fig. 2), or regulator seat (350, IPL Fig. 2). These items must be replaced each time they are removed for disassembly.

9. Miscellaneous Components

Do not clean used self-locking nuts (-375, IPL Fig. 2), seal housing assembly (325, IPL Fig. 2), piston seal (280, IPL Fig. 2) or tube assembly (335, IPL Fig. 2). These items must be replaced each time they are removed for disassembly.

Valve cores (-85, -105, -430, IPL Fig. 2), pressure gauges (5, 120, IPL Fig. 2) and transducers (10, 385, IPL Fig. 2) surfaces are cleaned with a moist cloth containing a 1% solution of Non-ionic Detergent (Table 403) and rinsed with a moist cloth containing warm (85-95 °F, 29-35 °C) water. Dry parts using clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C).

CHECK

1. General

After disassembly and cleaning of any component, assembly or unit, examine the part before assembly. If you are not sure that a part is serviceable, replace it.

Do not examine filters, preformed packings, metal boss seals, self-locking nuts, seal housing assembly, regulator seat, tube assembly, piston seal or safety discs. These items must be replaced each time they are removed during disassembly.

2. Special Tools, Fixtures and Equipment

A list of special tools, fixtures and equipment necessary to check components of the 898 Series Cylinder and Regulator Assembly is shown in Table 501. Unless otherwise noted, one of each item is required. Unless otherwise noted, one of each item is required. Equivalent tools, fixtures and equipment may be substituted.

Table 501
Special Tools, Fixtures and Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Bright Inspection Light	IL-24	Titan Tool and Supply Co. Buffalo, NY 14216-1784 USA (V51679)

3. Cylinder Check

Related reference documents are given in Table 502 (Cylinder Inspection Reference Documents) for both the composite cylinders and steel cylinders that are used in the 898 Series CRA. Table 503 (Cylinder Inspection Frequency) contains information about cylinder hydrostatic testing and cylinder service-life requirements. Any reference documents noted in Table 502 and cylinder inspection frequency or service life noted in Table 503 are valid for the date of issue for the 898 Series CRA Component Maintenance Manual.

Determine actual cylinder condition (e.g., serviceable, rejected, repairable or condemned) by using the applicable references from Table 502. All cylinder repairs must be made before a hydrostatic test of the cylinder is performed. Any cylinder that has been repaired (as required in the references in Table 502) needs a hydrostatic test before it is available for use. Any cylinder which fails the hydrostatic test must not be used (e.g., condemned).

Table 502
Cylinder Inspection Reference Documents

IPL FIG. 1 ITEM No.	US DEPARTMENT of TRANSPORTATION (DOT) DOCUMENT (Note 2)		COMPRESSED GAS ASSOCIATION (CGA) PHAMPHLET (Note 1)	
	No.	TITLE AND APPLICATION	No.	TITLE
30 thru -30D	DOT-E-8162-1859 **or** DOT-E-8391-1850	Exemption Certificate for Composite Cylinder. Exemption Certificate for Composite Cylinders.	C-1 C-6.1 C-6.2	Methods of Hydrostatic Testing of Compressed Gas Cylinders. Standard for Visual Inspection of High Pressure Aluminum Compressed Gas Cylinders. Guidelines for Visual Inspection & Requalification of Fiber Reinforced High Pressure Cylinders.
-40	49 CFR 173.34	DOT-3AA-1800 Steel Cylinder	C-1 C-5 C-6	Methods for Hydrostatic Testing of Compressed Gas Cylinders. Cylinder Service Life, Seamless Steel High Pressure Cylinders. Standards for Visual Inspection of Steel Compressed Gas Cylinders.
-40A thru -40E	49 CFR 173.34	DOT-3HT-1850 Steel Cylinder	C-1 C-8	Methods for Hydrostatic Testing of Compressed Gas Cylinders. Standard for Requalification of DOT-3HT Seamless Steel Cylinders.

Note 1: CGA Pamphlets can be ordered from:
Compressed Gas Association Inc.
1235 Jefferson Davis Highway
Arlington, VA 22202
Fax: 703-412-0128
(USA)

Note 2: DOT Documents can be ordered from:
Superintendent of Documents
Attn: New Orders
PO Box 371954
Pittsburgh, PA 15250-7954
Fax: 202-512-2233
(USA)

CFR Documents can be ordered from:
Superintendent of Documents
Government Printing Office
Washington, DC 20402
USA (V81955)

Table 503
Cylinder Inspection Frequency

CYL TYPE	ITEM No. (IPL FIG. 1)	CYL CALLOUT (FIG. 1001 in IPL)	CYL SERVICE LIFE, years (Note 1 & Note 2)	HYDROSTATIC TESTING PERIOD, years (Note 1)
Composite	30 thru -30D	C22, C40, C50, C77, C15	15	3
Steel	-40	S22	Unlimited Lifetime (Note 2)	5
	-40A thru -40E	S39, S49, S66, S76, S15	24 (Note 3)	3

Note 1: Specific information contained in these columns is taken directly from documents listed in Table 502.
Note 2: Cylinder service-life begins at the initial hydrostatic test date of the cylinder.
Note 3: Unlimited lifetime on condition that the cylinder does not fail any remaining inspection or hydrostatic test requirements.
Note 4: 24 years or 4380 pressurizations (that which occurs first).

3. Cylinder Check (Continued)

Check composite cylinders or steel cylinders as follows:

A. Composite Cylinders (30 thru -30D, IPL Fig. 1)

(1) Look at the date of the last hydrostatic test of the cylinder. Hydrostatic test dates will be shown on the cylinder neck or on a hydrostatic retest label. The cylinder may have more than one hydrostatic retest label. The initial cylinder test date and DOT exemption certificate number are shown on the manufacturer's identification plate found on the cylinder side wall.
A hydrostatic test must be performed as noted in Table 503 by service locations having up-to-date United States Department of Transportation Approval.

(2) Composite cylinder service-life is as noted in Table 503.

(3) Check the exterior of cylinders for twists or bends, cuts in the fiber over-wrap, either heat or fire damage, contamination or other damage.

(4) Make sure that identification plates and warning labels can be read and are not damaged.

(5) Check cylinder neck for cracks and distortion. Also check cylinder threads for damage and contamination.

3. Cylinder Check (Continued)

A. Composite Cylinders ... (Continued)

NOTE: Make sure that the sealing surface between the regulator and the cylinder does not have nicks, cuts and distortion. Leakage will occur between the regulator and cylinder if this surface is distorted or damaged.

(6) Put a Bright Inspection Light (Table 501) inside the cylinder and check for contamination and corroded surfaces.

(7) Make sure the inside of the cylinder does not have an odor.

B. Steel Cylinders (-40 thru -40E, IPL Fig. 1)

Steel cylinders are identified as either type DOT-3AA-1800 or type DOT-3HT-1850.

(1) DOT-3HT-1850 Steel Cylinders (-40A thru -40E, IPL Fig.1).

(a) Look at the last and initial cylinder hydrostatic test dates found on the cylinder crown, near the cylinder neck.

Hydrostatic tests must be performed as noted in Table 503 using approved procedures by service locations having up-to-date United States Department of Transportation Approval.

(b) DOT-3HT-1850 type steel cylinder service-life is as noted in Table 503.

(c) Check cylinder surfaces for either heat or fire damage.

(d) Check cylinder for dents, gouges, digs or bulges.

NOTE: It may be necessary to remove any heavy paint coatings from the exterior surface of the cylinder to correctly check for dents, gouges, digs or bulges.

(e) Make sure that identification plates and warning labels can be read and are not damaged.

(f) Check cylinder neck for cracks, distortion, contamination or thread damage.

(g) Put a Bright Inspection Light (Table 501) inside the cylinder and check for contamination and corroded surfaces.

(h) Make sure the inside of the cylinder does not have an odor.

3. Cylinder Check (Continued)

B. Steel Cylinders ... (Continued)

(2) DOT-3AA-1800 Steel Cylinders (-40, IPL Fig.1).

(a) Look at the last cylinder hydrostatic test date found on the cylinder crown or side wall near the crown.

Hydrostatic tests must be performed as noted in Table 503 using approved procedures by service locations having up-to-date United States Department of Transportation Approval.

(b) Check cylinder exterior surface for evidence of dents, gouges, pitting, digs or bulges.

NOTE: It may be necessary to remove any heavy paint coatings from the exterior surface of the cylinder to correctly check for dents, gouges, digs or bulges.

(c) Check cylinder for either heat or fire damage.

(d) Check cylinder neck for cracks, distortion, contamination and thread damage.

(e) Make sure that identification plates and warnings labels can be read and are not damaged.

(f) Put a Bright Inspection Light (Table 501) inside the cylinder and check for contamination and corroded surfaces.

(g) Make sure the inside of the cylinder does not have an odor.

4. Regulator Check

A. Check the surfaces and threaded areas for signs of damage, contamination, galling, burrs, corrosion or too much wear.

CAUTION: A REGULATOR UNIT MAY BE DAMAGED OR FAIL IF PART(S) THAT EITHER HAVE, OR HAVE CAUSED, TOO MUCH WEAR OR DAMAGE ON ADJACENT SEALING SUFACES ARE NOT REPLACED.

B. Check mating parts and sealing surfaces for scratches and other damage that will cause incorrect regulator assembly (10 thru -20H, IPL Fig. 1) operation.

C. Check the pressure transducer (10, 385, IPL Fig. 2) for external damage or broken electrical contact pins.

D. Check pressure gauge (5, 120, IPL Fig. 2) for a damaged gauge case, gauge lens and mounting ring, or pressure indicating pointer.

E. Make sure that all identification plates and labels can be read and are not damaged.

REPAIR

1. General

This section gives the repair procedures that can be performed. Before repair, components must be examined using procedures in the CHECK section.

2. Reference Documents

A list of applicable reference documents is given in Table 601.

Table 601
Reference Documents

DOCUMENT NUMBER	DOCUMENT NAME	ORDERING INFORMATION
DOD-P-16232	Phosphate Coatings, Heavy, Manganese or Zinc Base, (For Ferrous Metals)	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)
TT-C-490	Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)
FED-STD-595	Colors Used in Government Procurement	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)

3. Consumable Repair Materials

A list of applicable consumable materials is given in Table 602. Equivalent materials may be substituted.

Table 602
Consumable Materials

MATERIAL	DESCRIPTION	MANUFACTURER (w/ VENDOR CODES)
Chromic Acid	Chromium (VI) Trioxide (CrO_3)	J.T. Baker Chemical Co. Phillipsburg, NJ 08865-2219 USA (V70829)
Phosphoric Acid	Phosphoric Acid (H_3PO_4)	J.T. Baker Chemical Co. Phillipsburg, NJ 08865-2219 USA (V70829)

Table 602 (Continued)
Consumable Materials

MATERIAL	DESCRIPTION	MANUFACTURER (w/ VENDOR CODES)
Hydrochloric Acid	Hydrochloric Acid (HCl)	J.T. Baker Chemical Co. Phillipsburg, NJ 08865-2219 USA (V70829)
pH Test Paper Strips	4391-01	J.T. Baker Chemical Co. Phillipsburg, NJ 08865-2219 USA (V70829)
Phosphate Coating Solution	CrysCoat®-OC ($Zn(H_2PO_4)_2 \cdot 2H_2O$)	Oakite Products Inc. Berkeley Heights, NJ 07922-2712 USA (V44389)
Sandpaper	Silicon Carbide (400 Grit)	Local Vendor
Plastic Abrasive Pad	Scotch-Brite Pad (No. 2 Size) P/N 10116NA	3M Abrasive Systems Division St. Paul, MN 55144-1000 USA (V0T1L6)
Conical Paint Strainer	8 in. (20.3 cm) Diameter	Gerson Company Inc. Middleboro, MA 02346-2228 USA (V26895)
Masking Tape	0.75 in. (1.9 cm) and 1.0 in. (2.5 cm) Widths	Local Vendor
Catalyst	P/N R6120	AP Nonweiler Co. Oshkosh, WI 54902-1007 USA Fax: 414-231-8085
Primer, Light Gray No. 36628 (FED-STD-595)	P/N 4285A093	AP Nonweiler Co. Oshkosh, WI 54902-1007 USA Fax: 414-231-8085
Paint, Green No. 24062 (FED-STD-595)	P/N 4285A073	AP Nonweiler Co. Oshkosh, WI 54902-1007 USA Fax: 414-231-8085
Paint, Green No. 14187 (FED-STD-595)	P/N 573102	Sherwin Williams Co. Riverside, CA 92501 USA (V0CBV6)
Abrasive Blasting Media	P/N 1700164 (No. 16 Aluminum Oxide)	Treibacher - Schleifmittel Co. Niagara Fall, NY 14303 USA Fax: 716-286-1224

NOTE: CrysCoat® is a Registered Trademark of Oakite Products Inc.

4. Special Tools, Fixtures and Equipment

A list of special tools, fixtures and equipment necessary for repair is shown in Table 603. Unless otherwise noted, one of each item is required. Equivalent tools, fixtures and equipment may be substituted.

Table 603
Special Tools, Fixtures and Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Bright Inspection Light	IL-24	Titan Tool & Supply Buffalo, NY 14216-1784 USA (V51679)
Spray Gun	Model 19	Binks Manufacturing Company Franklin Park, IL 60131-2887 USA (V07334)
Cylinder Hanger (0.750 - 16 UNF Threads)	SK87-117-08	Bolero Industries Santa Fe Springs, CA 90670 USA (V0TRZ6)
Cylinder Hanger (1.00 - 11½ ANPT Threads)	PP1005-00	Hecker Tools Mukwonago, WI 53149 USA Fax: 414-363-9473

5. Repair

Limit repairs to the procedures given below:

A. Cleaning (refer to the CLEANING section).

B. Removal of unwanted sharp edges.

C. Thread repair.

D. Replacement of cracked, bent, broken, scratched, or otherwise damaged components.

E. Replacement of filters, preformed packings, metal boss seals, self-locking nuts, seal housing assembly, regulator seat, tube assembly, piston seal or safety discs, when removed during disassembly.

F. Steel cylinder phosphate coating (refer to Paragraph 6. in this section).

G. Steel cylinder paint application (refer to Paragraph 7. in this section).

H. Composite cylinder paint application (refer to Paragraph 8. in this section).

6. Steel Cylinder Phosphate Coating

Refer to Reference Document DOD-P-16232 (Table 601) for additional information on steel cylinder phosphate coating (Type "Zinc" Class "3") procedures.

WARNING: FAILURE TO REFER TO THE MANUFACTURER'S OR SUPPLIER'S MATERIAL SAFETY DATA SHEETS (MSDS) FOR HYDROCHLORIC ACID, CHROMIC ACID, PHOSPHORIC ACID OR PHOSPHATE COATING SOLUTION FOR MORE PRECAUTIONARY DATA, APPROVED SAFETY EQUIPMENT AND EMERGENCY MEDICAL AID MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

Steel cylinders (-20 thru -20E, IPL Fig. 3) that require interior and exterior protective treatment may be phosphate coated as follows.

A. Pre-cleaning

Abrasive blasting with Abrasive Blasting Media (Table 602) is preferred for interior and exterior preparation of the cylinder before phosphate coating application. All paint must be removed from the cylinder external surface during the abrasive blasting process.

(1) Abrasive blast cylinder interior and exterior with Abrasive Blasting Media, removing corrosion and paint. Refer to Reference Document TT-C-49 (Table 601) for approved method for interior and exterior abrasive blasting of steel cylinders.

(2) Rinse cylinder interior and exterior for at least one minute with clean water.

(3) Dry the cylinder with clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C).

(4) Put a Bright Inspection Light (Table 603) inside the cylinder and inspect for contamination and corrosion.

(5) If corrosion remains on cylinder interior or exterior surfaces, the cylinder may be treated with hydrochloric acid solution.

(6) Prepare a 20 percent (by volume) solution of Hydrochloric Acid (Table 602) in clean water.

(7) Place cylinder in hydrochloric acid solution for one minute.

(8) Rinse cylinder for at least one minute with clean water

B. Phosphate Coating

(1) Place the cylinder in a tank containing a heated (180-210 °F, 82-100 °C) 2-3 percent (by volume) Phosphate Coating Solution (Table 602) for a minimum of 30 minutes. The solution must be circulating at a rate of 5 - 20 gallons (19 - 76 liters) per minute.

6. Steel Cylinder Phosphate Coating (Continued)

B. Phosphate Coating (Continued)

(2) Spray-rinse cylinder interior and exterior with cold, clean water for at least one minute.

NOTE: Cylinders may be placed in a suitable tank, rather than sprayed, if a continuous flow of cold, clean rinse water is maintained. The cylinder should remain in the rinse water only for the period of time necessary to remove any residual Phosphate Coating solution.

(3) Prepare a chromic acid rinse solution by mixing 8 oz. (237 ml) of Chromic Acid (Table 602) in 100 gallons (379 liters) of clean water.

(4) Place cylinder in heated (160-180 °F, 71-82 °C) chromic acid solution for at least 1 minute.

(5) The hydrogen ion concentration (pH) of the chromic acid rinse solution must be maintained between 2 - 4 by the addition of mixtures of Chromic and Phosphoric Acids (Table 602). Test the chromic acid rinse solution using pH Test Paper Strips (Table 602). The chromic acid rinse solution must be discarded after 24 hours, regardless of the number of cylinders processed in the solution.

(6) Dry cylinder using clean, dry air that is oil-free and heated (180-200 °F, 82-93 °C).

NOTE: To produce a uniform phosphate coating thickness of 0.0002 - 0.0006 inches (0.0051 - 0.0152 mm) on the cylinder surface a minimum weight of 1000 mg per ft^2 (1.076 mg per cm^2) of phosphate coating must be applied.

(7) Place a Bright Inspection Light (Table 603) inside the cylinder and inspect for a uniform phosphate coating. A uniform phosphate coating is gray to black in color and free from loose particles.

7. Steel Cylinder Paint Application

Paint must be applied only on the cylinder exterior surface.

Cylinder paint application may consist of either small spot repair(s) or complete repainting.

Hydrostatic test marks, hydrostatic re-test labels (15, IPL Fig. 3), as well as the permanently affixed cylinder manufacturers identification label (composite cylinders only (10 thru -10D, IPL Fig. 3)) must remain visible and readable after the paint application.

All other warning labels (30, 40, 50, IPL Fig. 3) and identification plate (50, IPL Fig 1) removed from cylinders during the paint application process must be replaced. Refer to the ASSEMBLY section for proper position and application of these items.

7. Steel Cylinder Paint Application (Continued)

WARNING: FAILURE TO REFER TO THE MANUFACTURER'S OR SUPPLIER'S MATERIAL SAFETY DATA SHEETS (MSDS) FOR PRIMER, PAINT OR CATALYSTS FOR MORE PRECAUTIONARY DATA, APPROVED SAFETY EQUIPMENT AND EMERGENCY MEDICAL AID MAY CAUSE SERIOUS PERSONAL INJURY OR DEATH.

A. Pre-painting Preparation

(1) Steel cylinders (-20 thru -20E, IPL Fig. 3) requiring a complete re-painting process should be phosphate coated before paint application. Refer to Paragraph 6. in this section to phosphate coat a steel cylinder.

(2) Steel cylinders requiring a spot re-painting process should be lightly sanded with Sandpaper (Table 602) next to the spot repair areas.

(3) Refer to Paragraph 6.A. in the CLEANING section and clean cylinder exterior surface to remove any contamination.

(4) Remove cylinder identification plate (50, IPL Fig. 1) and warning label (30, IPL Fig. 3), or install Masking Tape (Table 602) over these items to protect them from primer and paint over-spray.

B. Primer Application

(1) Thread Cylinder Hanger (1.00 - 11½ ANPT threads, Table 603) into cylinder.

(2) Mix Light Grey Primer (Table 602) and Catalyst (Table 602) using instructions supplied by the manufacturer.

(3) Filter catalyzed primer using a Conical Paint Strainer (Table 602) before filling Spray Gun (Table 603).

(4) Spray catalyzed primer on cylinder surface with a Spray Gun (Table 603) using instructions supplied by the manufacturer.

(5) Allow cylinder to air dry 15 - 20 minutes before application of paint.

C. Paint Application

(1) Thread Cylinder Hanger (1.00 - 11½ ANPT threads, Table 603) into cylinder.

(2) Mix Green Paint (Table 602) and Catalyst (Table 602) using instructions supplied by the manufacturer.

(3) Filter catalyzed paint using a Conical Paint Strainer (Table 602) before filling Spray Gun (Table 603).

(4) Spray catalyzed paint on cylinder surface with a Spray Gun (Table 603) using instructions supplied by the manufacturer.

(5) Air-dry cylinder for 60 - 90 minutes (at approximately 70 °F, 21 °C) **or** 25 - 30 minutes (at 100 - 150 °F, 38 - 66 °C).

7. Steel Cylinder Paint Application (Continued)

C. Paint Application (Continued)

(6) Wait 24 hours, allowing paint to cool and stabilize, before placing cylinder into service.

8. Composite Cylinder Paint Application

Paint must be applied only on the cylinder exterior surface.

Cylinder paint application may consist of either small spot repairs or complete re-painting.

A. Pre-Painting Preparation

CAUTION: THE COMPOSITE CYLINDER OVER-WRAP, OR REINFORCING FIBERS, MUST NOT BE ABRADED DURING THE PRE-PAINTING PREPARATION OR PERMANENT CYLINDER DAMAGE MAY RESULT.

(1) Composite cylinders (-10 thru -10D, IPL Fig. 3) requiring spot repair or complete re-painting should be lightly sanded with a Plastic Abrasive Pad (Table 602) to roughen surface. **DO NOT** sand through the existing cylinder paint.

(2) Refer to Paragraph 6.A. in the CLEANING section and clean cylinder exterior surface to remove contamination.

(3) Remove cylinder identification plate (50, IPL Fig. 1) and warning labels (30, 40, 50, IPL Fig. 3), or install Masking Tape (Table 602) over them to protect from paint over-spray. **DO NOT** remove any hydrostatic re-test labels (15, IPL Fig. 3) from cylinders. Hydrostatic re-test labels and the cylinder manufacturers identification label on composite cylinders must be covered with Masking Tape (Table 602) before painting.

B. Paint Application

(1) Thread Cylinder Hanger (0.750 - 16 UNF threads, Table 603) into cylinder.

(2) Mix Green Paint (Table 602) and Catalyst (Table 602) using instructions supplied by the manufacturer.

(3) Filter catalyzed paint using a Conical Paint Strainer (Table 602) before filling Spray Gun (Table 603).

(4) Spray catalyzed paint on cylinder surface with a Spray Gun (Table 603) using instructions supplied by the manufacturer.

(5) Air-dry cylinder for 60 - 90 minutes (at approximately 70 °F, 21 °C) **or** 25 - 30 minutes (at 100 - 125 °F, 38 - 52 °C).

(6) Wait 24 hours, allowing paint to cool and stabilize, before placing cylinder into service.

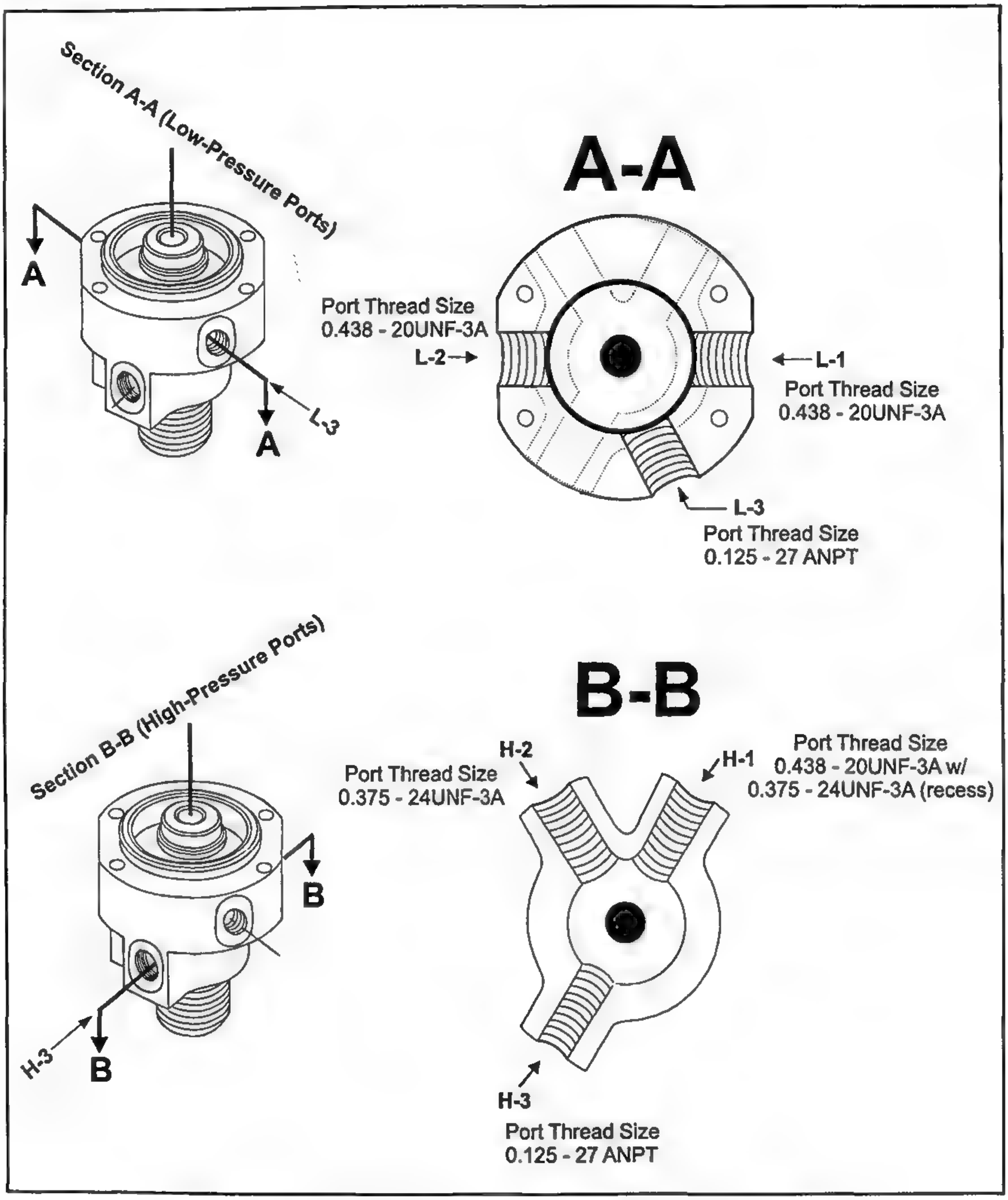
ASSEMBLY

1. General

This section describes the equipment and procedures necessary for assembly of the 898 Series Cylinder and Regulator Assembly (CRA). Assembly is organized as follows.

Paragraph	Description	IPL Figure No.
5	General Regulator Assembly	2
6	Toggle-Operated Regulator	2
7	Lever-Operated Regulator	2
8	Label Installation	1, 2 and 3
10	Final Regulator Assembly	1, 2, 3
11	Cylinder Charging Procedure	2
12	Storage	None

Regulators (10 thru -10C, 20 thru -20H, IPL Fig. 1) contain three high pressure ports and three low pressure ports. High pressure ports (H-1, H-2, H-3) are located near the base section (closest to the cylinder). Low pressure ports (L-1, L-2, L-3) are located near the attached regulator housing (240, IPL Fig. 2). Refer to Fig. 701 to locate ports and their internal thread sizes.



Regulator Body Assembly Port Locations and Thread Sizes
(Top View w/ Housing and All Internal Parts Removed)
Figure 701

2. Assembly Materials

A list of consumable assembly materials is shown in Table 701. Also, reference documents shown in Table 702 contain important information for some consumable materials specified. Equivalent materials may be substituted for listed items, except for Oxygen Compatible Lubricant.

Table 701
Consumable Assembly Materials

MATERIAL	DESCRIPTION	MANUFACTURER (w/ VENDOR CODE)
Leak Test Solution	Sherlock Leak Detector, Type I (MIL-L-25567 D Equivalent)	Winton Products Company Inc. Charlotte, NC 28236 USA (V23316)
Oxygen	MIL-PRF-27210, Type I	Local Vendor
Oxygen Compatible Lubricant	Krytox® 240 AZ (SPN 50521-00)	E.I. du Pont de Nemours & Co. Wilmington, DE 19899 USA (V18873)
Thread Sealing Tape	PTFE Ribbon Dope (CID A-A-58092, size 1) (SPN 50011-00)	Local Vendor
Lockwire	P/N MS20995C20 (SPN 13603-00)	Local Vendor (V96906)
Powdered Lubricant	MolyCoat® Z (SPN 50021-01)	Dow Corning Corp. Midland, MI 48686-0997 USA (V71984)

NOTE: Krytox® is a Registered Trademark of E.I. du Pont de Nemours & Co..
MolyCoat® is a Registered Trademark of Dow Corning Corporation.

Table 702
Reference Documents

DOCUMENT NUMBER	DOCUMENT NAME	ORDERING INFORMATION
CID A-A-58092	Commercial Item Description Tape Antiseize, Polytetrafluoro-ethylene	US Department of the Navy Defense Printing Services 700 Robbins Avenue Philadelphia, PA 19111 USA
MS33540	Military Standard Safety Wiring and Cotter Pinning, General Practices for	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)

Table 702 (Continued)
Reference Documents

DOCUMENT NUMBER	DOCUMENT NAME	ORDERING INFORMATION
MIL-L-25567	Military Specification Leak Detection Compound, Oxygen Systems	Superintendent of Documents US Government Printing Office Washington, DC 20402 USA (V81955)

3. Special Tools, Fixtures and Equipment

Special tools, fixtures and equipment required for assembly of the 898 Series CRA are shown in Table 703. Fig. No. information provided in the "NOMENCLATURE" column corresponds to the tool listing in Table 901 of the SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT section. Unless otherwise noted, one of each item is required. Equivalent tools, fixtures and equipment may be substituted.

Table 703
Special Tools, Fixtures and Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Pneumatic Bench Vise	Model BV-101-P P/N 58634	Getz Fire Equipment Peroria, IL 61602-1711 USA (V58013)
Plastic Rod	0.250 in. (6.35 mm) Diameter x 5 in. (13 mm) Length	Local Vendor
Crowfoot Adapter	0.625 in. (16 mm) Nut Size	Local Vendor
Test Regulator (0-2500 psig (0-17.2 MPa) Outlet Pressure)	"44-1100 Series" 44-1114-24	Tescom Corp. Elk River, MN 55330-2245 USA (V5H642)
Torque Wrench (0- 6 in•lb (0 - 0.68 N•m))	SL-S	Seekonk Manufacturing Co. Seekonk, MA 02771 USA (V53205)
Pressure Gauge (0-2000 psig (0-13.8 MPa))	"1403" or "1404" Series	Ametek (US Gauge) Sellersville, PA 18960-2625 USA (V61349)
Refill Coupling	5020-01	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Pigtail	5082-00	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)

Table 703 (Continued)
Special Tools, Fixtures and Equipment

NOMENCLATURE	PART NUMBER (or DESCRIPTION)	MANUFACTURER (w/ VENDOR CODE)
Offset Spanner Wrench (½ in. Drive) (Fig. 901)	898940-S91-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Regulator Assembly Fixture (Fig. 902)	898940-S50-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Regulator Clamp Adapter (Fig. 903)	898940-S57-3	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Cylinder/Valve Wrench (Fig. 904)	800216-T91-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Disc Drive Set (Fig. 905)	803949-S52-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Nesting Plate (Fig. 906)	803949-S57-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
O-Ring Stylus (Fig. 907A)	803946-S52-1-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
O-Ring Stylus (Fig. 907B)	803946-S52-1-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Seat Installation Tool (Fig. 908)	803946-S52-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Retainer Ring Assembly Tool (Fig. 909A)	803946-S53-1-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Retainer Ring Assembly Tool Pusher (Fig. 909B)	803946-S53-1-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Crowfoot Adapter (0.750 in. (19 mm) nut size) (Fig. 910)	898940-S91-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Charging Fitting (Fig. 914)	29485-S130-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)

4. Pre-Assembly Requirements

WARNING: FAILURE TO USE TOOLS THAT ARE FREE FROM DUST, LINT, FINE METAL FILINGS, OIL, GREASE, FLAMMABLE SOLVENTS OR OTHER COMBUSTIBLE MATERIALS ON PARTS THAT ARE EXPOSED TO PRESSURIZED OXYGEN MAY RESULT IN FIRE, EXPLOSION OR PERSONAL INJURY.

A. All components that are to be used in assembly of the CRA shall have been cleaned and checked in accordance with the preceding sections of this manual. Also, all shall have passed requirements of Component Test Procedures (Para. 5.) in the Testing and Fault Isolation section.

B. Unless otherwise noted, all preformed packings and metal-boss seals (365, 395, IPL Fig. 2) shall be lubricated with a thin film of Oxygen Compatible Lubricant (Table 701) prior to installation.

C. Unless otherwise noted, all parts which require threading, twisting or turning operations for assembly will be threaded, twisted or turned in a clockwise direction.

D. Apply Thread Sealing Tape (Table 701), when indicated, according to Commercial Item Description Specification CID-A-A-58092 (Table 702).

E. Apply Lockwire (Table 701), when indicated, according to Military Specification MS33540 (Table 702)

5. General Regulator Assembly

Refer to IPL Fig. 2.

A. Body Assembly (-330, -330A)

(1) Place O-Ring Stylus (SPN 803946-S52-1-2, Table 703) into small internal diameter of seat (350).

(2) Slide preformed packing (355) onto O-Ring Stylus and into groove on seat (350).

(3) Place seat (350) with installed preformed packing (355) into regulator body (360, -360A) with the larger internal diameter end of the seat (350) positioned into the regulator body.

(4) Using Seat Installation Tool (Table 703), gently push assembled seat (350) into regulator body. Ensure that the seat (350) is positioned on the seat seating-edge in the regulator body.

(5) Insert spacer (345) into regulator body (360, -360A) with end containing cross-drilled holes positioned into the regulator body.

(6) Insert filter (340) into recess of spacer (345). The course side of the filter must be positioned out (away) from the spacer.

(7) Thread tube assembly (335) into regulator body (360, -360A). Torque tube assembly to 75-100 in•lbs (8.5-11.3 N•m).

5. General Regulator Assembly (Continued)

B. Safety Disc (55, -55A)

(1) Apply a thin layer of Powdered Lubricant (Table 701) on safety plug washer (60).

(2) Insert lubricated safety plug washer (60) into port H-1 of the regulator body (360, -360A).

(3) Insert safety disc (55, -55A) on top of lubricated safety plug washer (60).

(4) Carefully thread burst disc spacer (50) into port H-1 on the regulator body (360, -360A). Torque spacer 75 - 100 in•lbs (8.5 - 11.3 N•m).

C. Seal Housing Assembly (325)

The seal housing assembly (325) is made up of a housing, washer, and an internal preformed packing, which are non-procurable.

(1) Place O-Ring Stylus (SPN 803946-S52-1-1, Table 703) into small internal diameter end of seal housing assembly (325).

(2) Slide preformed packing (320) onto O-Ring Stylus and into groove on seal housing assembly (325).

D. Spring Assembly (-285)

(1) Place disc (305) in bottom of retainer (295).

(2) Insert spring (300) into the retainer (295) so that it rests on top of disc (305).

CAUTION: FAILURE TO USE THE NESTING PLATE AND DISC DRIVE SET DURING ASSEMBLY OF THE SPRING ASSEMBLY MAY CAUSE DAMAGE TO, OR LOSS OF, PARTS FROM THE SPRING ASSEMBLY WHEN CAP IS THREADED ONTO THE RETAINER.

(3) Place retainer (295) containing spring (300) and disc (305) into Nesting Plate (Table 703).

(4) Compress spring (300) while threading cap (290) fully onto retainer (295) using the Disc Drive Set (Table 703).

E. Regulating Piston (265) Preparation

(1) Install piston seal (280) onto regulating piston (265) so that the open end of the piston seal is facing away from the seal seating-edge on regulating piston (Refer to IPL Fig. 2 Sheet 1).

(2) Place Retainer Ring Assembly Tool (Table 703) on top of regulating piston (265).

(3) Place retaining ring (275) on Retainer Ring Assembly Tool. Push the retainer ring firmly into place (securing piston seal (280) on regulating piston (265)) using Retainer Ring Assembly Tool Pusher (Table 703).

5. General Regulator Assembly (Continued)

E. Regulating Piston (265) Preparation (Continued)

(4) Install O-Ring Stylus (SPN 803946-S52-1-1, Table 703) over the small diameter end of the regulating piston (265).

(5) Slide preformed packing (270) onto O-Ring Stylus and into groove on regulating piston (265).

F. Housing Assembly (240) Preparation

Preparation of the housing assembly (240) for assembly to the regulator body (360, -360A) requires the installation of the seal housing assembly (prepared in Para. 5.C.), spring assembly (prepared in Para. 5.D.) and regulating piston (prepared in Para. 5.E.).

(1) Apply a thin film of Oxygen Compatible Lubricant (Table 701) to stem of actuation pin (310).

(2) Install shim (315) on stem of the actuation pin (310).

(3) Install actuation pin (310) into the hole in the seal housing assembly.

(4) Carefully install seal housing assembly and actuation pin into housing assembly (240) so that actuation pin rests in the opening at top of housing assembly.

(5) Apply a thin film of Oxygen Compatible Lubricant (Table 701) to the surface of the piston seal (280) on the regulating piston.

(6) Install spring assembly into the large inside diameter opening of the regulating piston, so that the slotted face of the spring assembly is positioned out.

NOTE: The combined spring assembly/regulating piston must be carefully installed in the housing assembly (240) so that the actuation pin and seal housing assembly are not moved out of position.

(7) Carefully put the combined spring assembly/regulating piston into the housing assembly (240). Push on combined spring assembly/regulating piston until it comes to rest in the housing assembly (240).

(8) Install poppet (260) inside of regulating piston. Insure that poppet moves freely.

(9) Install all shims (255, -225A), removed during disassembly, on regulating piston into housing assembly (240).

(10) Install reference force spring (250) on shims and regulating piston into housing assembly (240).

5. General Regulator Assembly (Continued)

G. Assembly of Body Assembly (-330, -330A) and Housing Assembly (240)

Assembly of the body assembly and housing assembly requires joining the body assembly (prepared in Para. 5.A.) and housing assembly (prepared in Para. 5.F.).

NOTE: Refer to Fig. 701 to locate low-pressure ports L-1 and L-2.

(1) Place body assembly (-330, -330A) in Oxygen Regulator Assembly Fixture (Table 703) containing Oxygen Regulator Clamp Adapter (SPN 898940-S57-3).

(2) Turn the body assembly in the fixture so that low-pressure port L-1 or L-2 is positioned up.

WARNING: FAILURE TO SECURE REGULATOR IN THE OXYGEN REGULATOR ASSEMBLY FIXTURE AND OXYGEN REGULATOR CLAMP ADAPTER DURING ASSEMBLY MAY RESULT IN SERIOUS PERSONAL INJURY BECAUSE A SPRING LOCATED BETWEEN HOUSING ASSEMBLY AND BODY ASSEMBLY EXERTS 70-80 POUNDS (311-356 N) OF FORCE.

(3) Place housing assembly in Oxygen Regulator Assembly Fixture, vent hole facing up, between the body assembly and the fixture clamping mechanism. Turn the housing assembly to align the four screw holes with through holes in the adjacent body assembly (-330, -330A).

WARNING: FAILURE TO HOLD REGULATOR ASSEMBLY TIGHT IN OXYGEN REGULATOR ASSEMBLY FIXTURE AS THE FIXTURE CLAMP IS SLOWLY ENGAGED MAY RESULT IN SERIOUS PERSONAL INJURY BECAUSE OF PARTS BEING EJECTED BY SPRING FORCE BETWEEN HOUSING ASSEMBLY AND BODY ASSEMBLY.

(4) When screw holes are aligned, slowly compress housing assembly and body assembly together using clamping mechanism of the Oxygen Regulator Assembly Fixture.

(5) Install four cap screws (245) used to join body assembly and housing assembly together. Using Torque Wrench SL-S (Table 703), torque cap screws to 12 - 15 in•lbs (1.4 - 1.7 N•m).

(6) Slowly release clamp mechanism on Oxygen Regulator Assembly Fixture and remove joined body assembly and housing assembly.

6. Toggle-Operated Regulator

Refer to IPL Fig. 2.

A. Toggle Assembly (-135).

(1) Position housing assembly (155) so that the hole in housing for toggle shaft (150) is pointed to you.

(2) Position toggle (145) so that the letters "ON" are facing up and the toggle is in the right side of housing assembly (155).

(3) Carefully push non-threaded end of toggle shaft (150) through openings in both the housing assembly (155) and toggle (145). Thread shaft into housing assembly until it stops.

B. Place toggle filler (160) on housing assembly (240).

C. Install toggle assembly (-135) on housing assembly (240) so that the toggle (in the "ON" position) is directly above the L-1 port.

NOTE: Refer to Fig 701 to locate low-pressure port L-1.

D. Align the toggle filler (160) cut-outs with toggle (145).

E. Secure toggle assembly (-135) and toggle filler (160) on housing assembly (240) using four pan head screws (140). Using Torque Wrench SL-S (Table 703) torque screws to 3 - 4 in•lbs (0.3 - 0.5 N•m).

F. This completes the Toggle-Operated Regulator Assembly. Move to Paragraph 8. (Label Installation) and complete the remaining assembly procedures.

7. Lever-Operated Regulator

Refer to IPL Fig. 2.

A. Harness bracket assembly (-210).

(1) Attach insert assembly (220) in cable bracket (230) using retaining ring (225).

(2) Install screw (235) in insert assembly (220).

(3) Install cone-point set screws (215) in cable bracket (230).

B. Lever assembly (-165).

(1) Install straight pin (190) in lever (205).

(2) Install flat washer (200) on straight pin (190) under lever (205).

(3) Secure straight pin (190) and flat washer (200) to lever (205) using retaining ring (195).

C. Place harness bracket assembly (-210) around the top the housing assembly (240).

D. Align two cone-point set screws (215) in harness bracket assembly (-210) with corresponding marks on housing assembly (240). Using Torque Wrench SL-S (Table 703) torque cone-point set screws 5 - 10 in•lbs (0.6 - 1.1 N•m).

7. Lever-Operated Regulator (Continued)

   E. Place lever assembly (-165) on the top of the housing assembly (240). Align lever (205) so that straight pin (190) in lever assembly (-165) is positioned adjacent to insert assembly (220) of harness bracket assembly (-210).

   F. Place two lever bushings (185) in lever assembly (-165).

   G. Place flat washer (180) over lever bushing (185) in the slotted section of the lever assembly (-165) adjacent to straight pin (190).

   H. Place flat washer (175) over remaining lever bushing (185).

   I. Insert two fillister head screws (170) thru flat washers (175, 180) and two lever bushings (185) into housing assembly (240). Using Torque Wrench SL-S (Table 703) torque fillister head screws 5 - 9 in•lbs (0.6 - 1.02 N•m).

   J. Refer to lockwire procedure MS33540 (Table 702) and install lockwire (Table 701) between fillister head screws (170).

   K. Place lever assembly to the "ON" position.

   L. This completes the Lever-Operated Regulator assembly. Move to Paragraph 8. (Label Installation) and complete the remaining assembly procedures.

8. Label Installation

   A. Regulator Assembly Labels

   Apply only those labels removed during disassembly of the Regulator Assembly (10 thru -20H, IPL Fig. 1).

   Refer to Figure 701 and IPL Fig. 2 Sheet 4, unless otherwise noted.

   (1) Apply push-pull label (445) on cable bracket (230) for lever-operated regulators (10 thru -10C, IPL Fig. 1).

   (2) Apply labels (435, 440) on toggle assembly (-135) for toggle-operated regulators (20 thru -20H, IPL Fig. 1)

   NOTE: Add applicable information on regulator identification plate (455) in approximately 0.094 in. (2.39 mm) characters before applying new regulator identification plate on housing assembly (240).

   (3) Apply regulator identification plate (455) on housing assembly (240) above low-pressure port L-3.

   CAUTION: THE REGULATOR WARNING LABEL MUST NOT COVER THE VENT HOLE IN THE REGULATOR HOUSING OR IRREGULAR OPERATION OF THE REGULATOR ASSEMBLY MAY OCCUR.

   (4) Apply warning label (450) on housing assembly (240) above the regulator identification plate (455). Do not cover the vent hole on the housing assembly with the warning label.

B. Cylinder Assembly Labels

Refer to IPL Fig. 1 and Fig. 3.

Apply only those labels removed during disassembly of the Cylinder Assy (1 thru -2E, IPL Fig. 3). Refer also to Figure 702 and Table 704.

(1) Labels (30, 40, IPL Fig. 3) are located on the opposite side from the Manufacturers Identification Plate for composite cylinders (10 thru -10D, IPL Fig. 3).

(2) Apply warning label (40, IPL Fig. 3) on the cylinder crown at a distance of 1.06 - 1.18 in. (26.9 - 30.0 mm) from the neck of the cylinder (10 thru -10D, IPL Fig. 3).

(3) Using Figure 702 and information in Table 704, position and apply warning label (30, IPL Fig. 3) on the cylinder.

(4) Apply identification plate (50, IPL Fig. 1) at a distance of 0.44 - 0.56 in (11.2 - 14.2 mm) above, and in the same direction as, warning label (40, IPL Fig. 3).

(5) Apply warning label (50, IPL Fig. 3) on cylinder crown opposite of warning label (40, IPL Fig. 3).

NOTE: A hydrostatic test label (15, IPL Fig. 3) must be attached on composite cylinders after each cylinder hydrostatic test by the Registered Testing Agency performing the test. Existing labels installed on composite cylinders (10 thru -10D, IPL Fig. 3) must not be removed. The CHECK section of this manual provides details about hydrostatic testing requirements for composite cylinders.

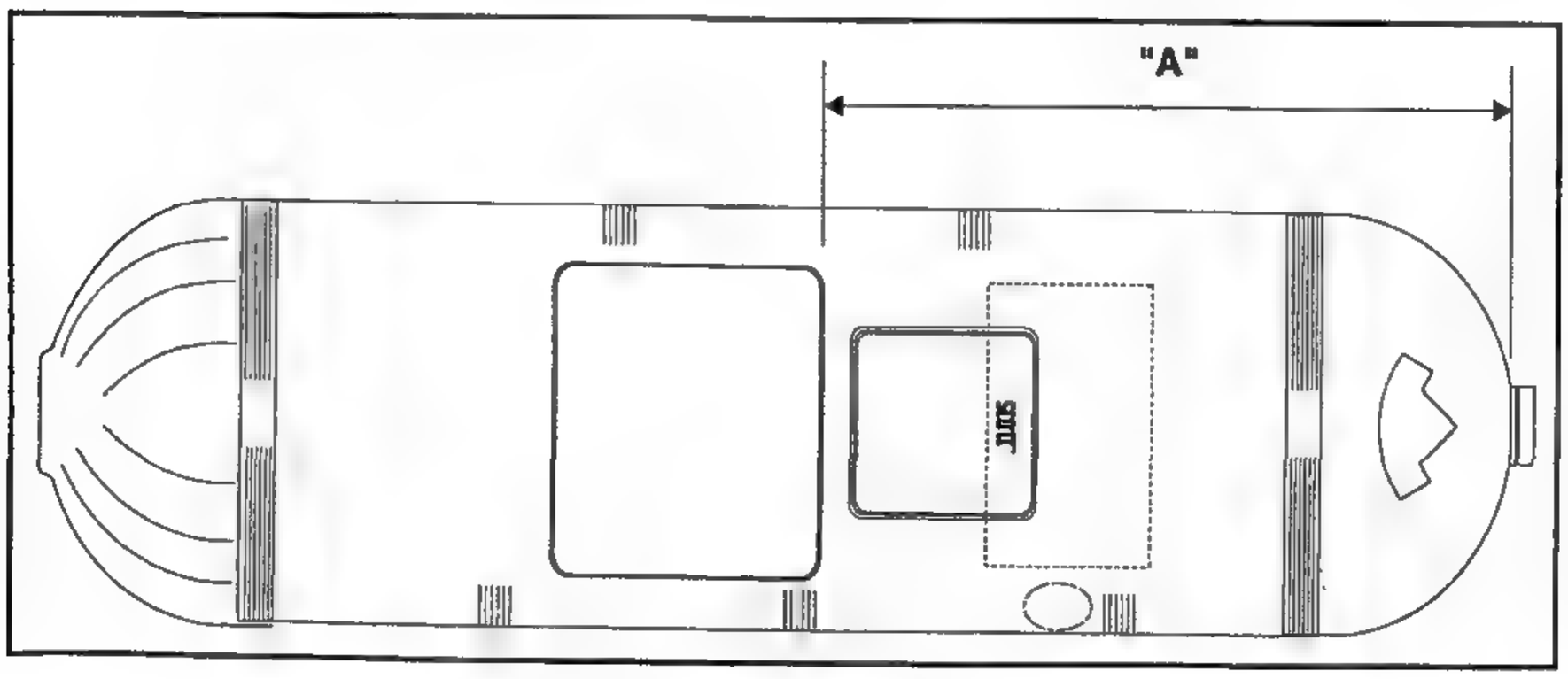


Figure 702
Warning Label Installation

Table 704
Warning Label Position

CYLINDER ASSEMBLY	APPROXIMATE "A" DIMENSION in. (cm) (Refer to Fig. 702)
1, IPL Fig. 3	9.25 (23.50)
-1A, IPL Fig. 3	11.75 (29.85)
-1B, IPL Fig. 3	14.25 (36.20)
-1C, IPL Fig. 3	15.25 (38.74)
-1D, IPL Fig. 3	9.50 (24.13)
-2, IPL Fig. 3	9.25 (23.50)
-2A, IPL Fig. 3	9.50 (24.13)
-2B, IPL Fig. 3	11.75 (29.85)
-2C, IPL Fig. 3	13.25 (33.66)
-2D, IPL Fig. 3	14.88 (37.80)
-2E, IPL Fig. 3	14.75 (37.47)

9. Testing

Perform the Regulator Test Procedures Paragraph 4. described in the Testing and Fault Isolation section of this manual.

Perform the Component Test Procedures Paragraph 5. described in the Testing and Fault Isolation section if components have not already been tested.

10. Final Regulator Assembly

A. Regulator/Cylinder Assembly

Refer to IPL Figs. 1, 2 and 3.

(1) Apply a thin film of Oxygen Compatible Lubricant (Table 701) to the metal boss seal (365, IPL Fig. 2).

(2) Install metal boss seal (365, IPL Fig. 2) on regulator assembly (10, -10A, 20 thru -20D, -20G, -20H, IPL Fig. 1) cylinder mating threads with the sealing flange facing out.

NOTE: Metal boss seal (365, IPL Fig. 2) is only used with straight thread (0.750 in. - 16 UNF) regulator bodies that attach to composite cylinder assemblies (30 thru -30D, IPL Fig. 1).

10. Final Regulator Assembly (Continued)

A. Regulator/Cylinder Assembly (Continued)

(3) Apply Thread Sealing Tape (Table 701) on regulator assembly (-10B, -10C, -20E, -20F, IPL Fig. 1) cylinder threads.

NOTE: Thread Sealing Tape (Table 701) is only used with tapered pipe thread (1.00 - 11½ ANPT) regulator bodies that attach to steel cylinders (-40 thru -40E, IPL Fig. 1).

CAUTION: FAILURE TO HOLD THE OXYGEN CYLINDER IN A PNEUMATIC BENCH VISE MAY CAUSE DAMAGE TO THE FIBER OVER-WRAP ON COMPOSITE CYLINDERS.

(4) Place cylinder (30 thru -40E, IPL Fig. 1) in a Pneumatic Bench Vise (Table 703) for installation of regulator assemblies (10 thru -20H, IPL Fig. 1).

(5) Install regulator assembly (10, -10A, 20 thru -20D, -20G, -20H, IPL Fig. 1) into cylinder assembly (30 thru -30D, IPL Fig. 1) hand tight.

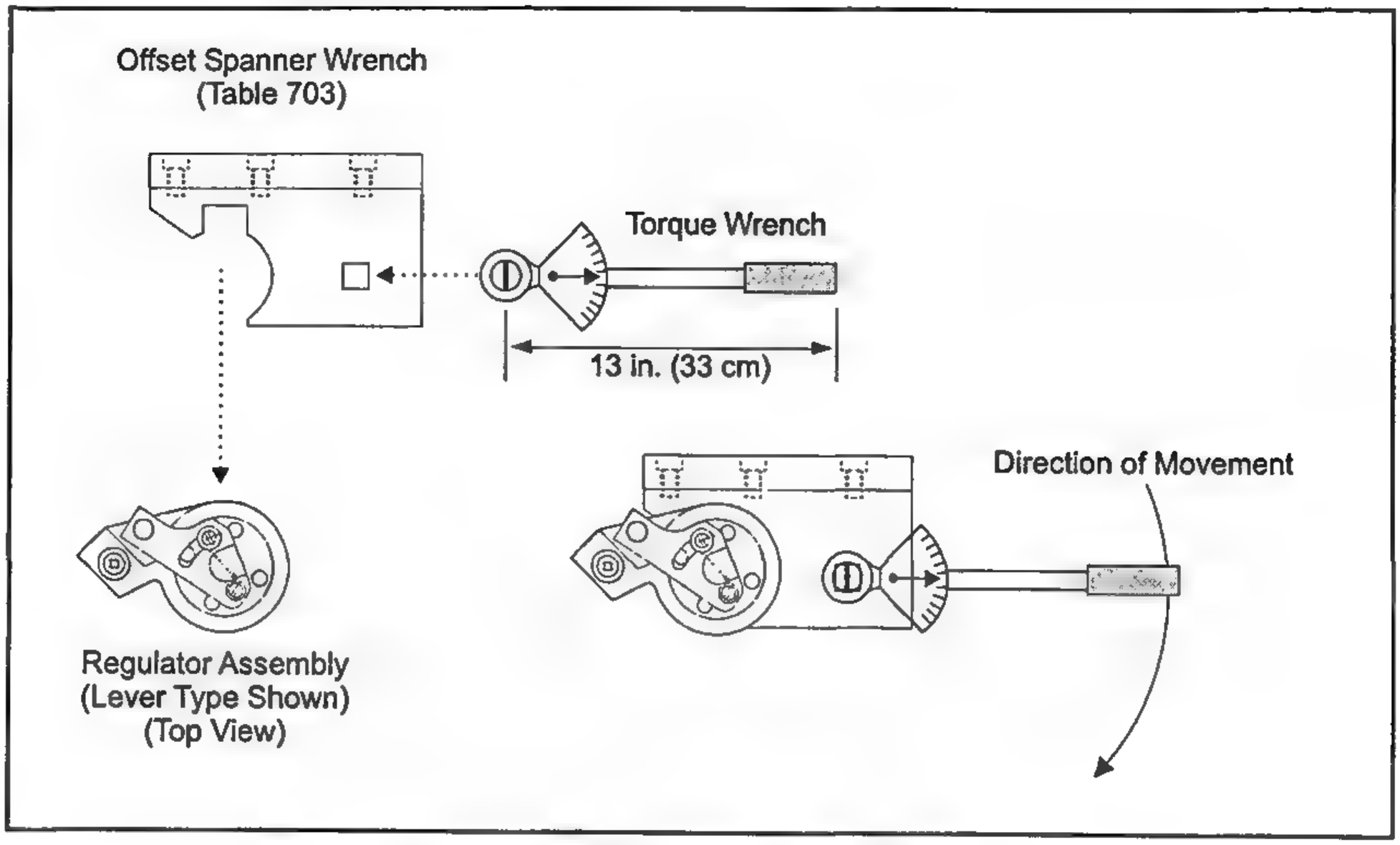
(6) Install regulator assembly (-10B, -10C, -20E, -20F, IPL Fig. 1) into cylinder assembly (-40 thru -40E, IPL Fig. 1) hand tight.

(7) Torque regulator (10, -10A, 20 thru -20D, -20G, -20H, IPL Fig. 1) into composite cylinder (30 thru -30D, IPL Fig. 1) 480 - 600 in•lbs (54.2 - 67.8 N•m).

NOTE: To produce the required torque, use Offset Spanner Wrench (Table 703) and a 13 in. (33 cm) long torque wrench to torque regulator into cylinder 408 - 514 in•lbs (46.1 - 58.1 N•m). Torque, applied to the regulator must be in a straight line as shown in Figure 703.

(8) Torque regulator (-10B, -10C, -20E, -20F, IPL Fig. 1) into steel cylinder (-40 thru -40E, IPL Fig. 1) 800 - 955 in•lbs (90.4 - 107.9 N•m).

NOTE: To produce the required torque, use Offset Spanner Wrench (Table 703) and a 13 in. (33 cm) long torque wrench to torque regulator into cylinder 689 - 822 in•lbs (77.7 - 92.8 N•m). Torque, applied to the regulator must be in a straight line as shown in Figure 703.



Regulator Installation Torque Setup
Figure 703

10. Final Regulator Assembly (Continued)

B. H-1 Port Devices

Refer to IPL Fig. 2.

(1) Insert male altered-connector (-40A) into burst disc spacer (50) on port H-1 on the regulator body (360, -360A). Torque male altered-connector 75 - 100 in•lbs (8.5 - 11.3 N•m). Refer to lockwire procedure MS33540 and install Lockwire (Table 701) between male connector (-40A) and cap screw (245).

(2) Adapter fitting (40).

(a) Insert burst disc catcher (-45) into adapter fitting (40).

(b) Install adapter fitting (40) into burst disc spacer (50) on port H-1 on the regulator body (360, -360A). Torque adapter fitting 75 - 100 in•lbs (8.5 - 11.3 N•m). Refer to lockwire procedure MS33540 and install Lock-wire (Table 701) between adapter fittine (40) and cap screw (245).

10. Final Regulator Assembly (Continued)

C. H-2 Port Devices

Refer to IPL Fig. 2.

(1) Pressure gauge (5).

(a) Install preformed packing (15) on pressure gauge (5)

(b) Thread pressure gauge (5) into regulator body (360, -360A). Torque pressure gauge 75 - 100 in•lbs (8.5 - 11.3 N•m) using a 0.625 in. (16 mm) Crowfoot Adapter (Table 703).

(2) Pressure transducer (10).

(a) Install preformed packing (15) on pressure transducer (10).

(b) Thread pressure transducer (10) into regulator body (360, -360A). Torque pressure transducer 75 - 100 in•lbs (8.5 - 11.3 N•m) using a 0.625 in. (16 mm) Crowfoot Adapter (Table 703).

(3) Flareless tube plug (420).

(a) Install preformed packing (405) on flareless tube plug (420).

(b) Thread flareless tube plug (420) into regulator body (360, -360A). Torque flareless tube plug 75 - 100 in•lbs (8.5 - 11.3 N•m).

(4) Filler valve assembly (-420A).

(a) Install valve core (-430) in valve body (-425) using Cylinder/Valve Wrench (Table 703). Using Torque Wrench SL-S (Table 703) torque valve core 4.5 - 5.0 in•lbs (0.51 - 0.56 N•m).

(b) Install preformed packing (405) on filler valve assembly (-420A).

(c) Thread filler valve assembly (-420A) into regulator body (360, -360A). Torque filler valve assembly 75 - 100 in•lbs (8.5 - 11.3 N•m).

(5) Charging valve assembly (-460).

(a) Install valve core (465) in valve body (470) using Cylinder/Valve Wrench (Table 703). Using Torque Wrench SL-S (Table 703) torque valve core 4.5 - 5.0 in•lbs (0.51 - 0.56 N•m).

(b) Install preformed packing (405) on charging valve assembly (-460).

(c) Thread charging valve assembly (-460) into regulator body (360, -360A). Torque charging valve assembly 75 - 100 in•lbs (8.5 - 11.3 N•m). Refer to lockwire procedure MS33540 (Table 702) and install Lockwire (Table 701) between charging valve assembly (-460) and cap screw (245).

(6) Temp/pressure transducer (385).

(a) Assemble tube nut (415) onto male/female 90° elbow (400) by threading the nut past the preformed packing area onto the second thread.

(b) Install backup retainer (410) on male/female 90° elbow (400).

(c) Install preformed packing (405) on male/female 90° elbow (400).

10. Final Regulator Assembly (Continued)

C. H-2 Port Devices (Continued)

(6) Temp/pressure transducer... (Continued)

(d) Thread male/female 90° elbow (400) with tube nut (415), preformed packing (405) and packing backup retainer (410) into regulator body (360, -360A). Tighten tube nut hand tight.

(e) Apply Oxygen Compatible Lubricant (Table 701) on metal boss seal (395) and install onto temp/pressure transducer (385) threads.

CAUTION: FAILURE TO HOLD ELBOW WITH A SUITABLE WRENCH WHILE APPLYING TORQUE TO TRANSDUCER MAY CAUSE PERMANENT DAMAGE TO THE TRANSDUCER OR ELBOW.

(f) Thread temp/pressure transducer (385) with attached metal boss seal (395) into male/female 90° elbow (400). Torque temp/pressure transducer 275 - 300 in•lbs
(31.1 - 33.9 N•m) using 0.750 in. (19 mm) Crowfoot Adapter (Table 703).

(g) Loosen tube nut (415) on male/female 90° elbow (400) and position temp/pressure transducer (385) to an angle of 40 degrees from vertical. Tighten tube nut holding transducer in this position.

CAUTION: THE REGULATOR CLAMP MUST NOT COVER THE VENT HOLE IN THE HOUSING OR IRREGULAR OPERATION OF THE REGULATOR ASSEMBLY MAY OCCUR.

(h) Install regulator clamp (370) onto housing assembly (240).

(j) Install transducer clamp (390) onto temp/pressure transducer (385)

(k) Attach transducer clamp (390) to regulator clamp (370) using pan head screw (-380) and self-locking nut (-375). Using Torque Wrench SL-S (Table 703), torque pan head screw into self-locking nut 3 - 4 in•lbs (0.3 - 0.5 N•m).

(l) Attach regulator clamp (370) to housing assembly (240) using pan head screw (-380) and self-locking nut (-375). Using Torque Wrench SL-S (Table 703), torque pan head screw into self-locking nut 3 - 4 in•lbs (0.3 - 0.5 N•m).

D. H-3 Port Devices

Refer to IPL Fig. 2.

Refer to Fig. 701 to locate high-pressure port H-3.

(1) Filter screen (-70)

(a) With the curved (convex) surface of the filter facing out of the regulator body, install filter screen (-70) into the regulator body (360, -360A) at high-pressure port H-3 location.

10. Final Regulator Assembly (Continued)

D. H-3 Port Devices (Continued)

(1) Filter screen ... (Continued)

(b) Push on the center of the filter screen (-70) with Plastic Rod (Table 703) until the curved (convex) surface is now facing into the regulator body.

(2) Filler valve assembly (100A).

(a) Thread valve core (-105) in body (-110) using Cylinder/Valve Wrench (Table 703). Using Torque Wrench SL-S (Table 703), torque valve core 4.5 - 5 in•lbs (0.51 - 0.56 N•m).

(b) Apply Thread Sealing Tape (Table 701) on filler valve assembly (100A).

(c) Install filler valve assembly (100A) into regulator body (360, -360A). Torque filler valve assembly 50 - 100 in•lbs (5.6 - 11.3 N•m).

(3) Filler valve assembly (80).

(a) Thread valve core (-85) into body (-90) using Cylinder/Valve Wrench (Table 703). Using Torque Wrench SL-S (Table 703) torque valve core 4.5 - 5.0 in•lbs (0.51 - 0.56 N•m).

(b) Apply Thread Sealing Tape (Table 701) on filler valve assembly (80).

(c) Install end containing ring of filler valve cap assembly (75) over filler valve assembly (80) external threads.

(d) Thread filler valve assembly (80) into regulator body (360, -360A). Torque filler valve assembly 50 - 100 in•lbs (5.6 - 11.3 N•m).

(e) Install end containing cap of filler valve cap assembly (75) on open end of filler valve assembly (80).

(4) Pipe fitting (115) with pressure gauge (120), filler valve assembly (100) and cap and chain assembly (125).

(a) Apply Thread Sealing Tape (Table 701) on pressure gauge (120) and pipe fitting (115) external threads.

(b) Thread pressure gauge (120) into pipe fitting (115). Refer to IPL Figure 2 Sheet 3 and tighten until pressure gauge position is 90 degrees to the axis of the pipe fitting.

(c) Assemble ring (130) onto end of cap and chain assembly (125).

(d) Install ring (130) over external threads of pipe fitting (115). Allow attached cap and chain assembly (125) to hang free from ring (130).

(e) Thread pipe fitting (115) (with attached cap and chain assembly (125), ring (130) and pressure gauge (120)) into regulator body (360, -360A). Tighten until top of the pressure gauge is positioned up, toward the regulator toggle assembly (-135) or lever assembly (-165).

(f) Thread valve core (-105) in body (-110) using Cylinder/Valve Wrench (Table 703). Using Torque Wrench SL-S (Table 703) torque valve core 4.5 - 5.0 in•lbs (0.51 - 0.56 N•m).

10. Final Regulator Assembly (Continued)

D. H-3 Port Devices (Continued)

(4) Pipe fitting (115) ... (Continued)

(g) Apply Thread Sealing Tape (Table 701) on filler valve assembly (100).

(h) Thread filler valve assembly (100) into pipe fitting (115). Torque filler valve assembly 50 - 100 in•lbs (5.6 - 11.3 N•m).

(j) Install cap and chain assembly (125) on open end of filler valve assembly (100).

(5) Branch tee fitting (115A) with pressure gauge (120), filler valve assembly (100B) and cap and chain assembly (125).

(a) Apply Thread Sealing Tape (Table 701) on pressure gauge (120) and branch tee fitting (115A) external threads.

(b) Thread pressure gauge (120) into branch tee fitting (115A). Refer to IPL Figure 2 Sheet 3 and tighten pressure gauge until the face it is positioned up toward regulator toggle assembly (-135) or lever assembly (-165).

(c) Assemble ring (130) onto end of cap and chain assembly (125).

(d) Install ring (130) over external threads of branch tee fitting (115A). Allow attached cap and chain assembly (125) to hand free from ring (130).

(e) Thread branch tee fitting (115A) (with attached cap and chain assembly (125)), ring (130) and pressure gauge (120) into regulator body (360, -360A). Tighten until pressure gauge face is positioned up, toward the regulator toggle assembly (-135) or lever assembly (-165).

(f) Thread valve core (-105) in body (-110) using Cylinder/Valve Wrench (Table 703). Using Torque Wrench SL-S (Table 703) torque valve core 4.5 - 5.0 in•lbs (0.51 - 0.56 N•m).

(g) Apply Thread Sealing Tape (Table 701) on filler valve assembly (100B).

(h) Thread filler valve assembly (100B) into branch tee fitting (115A). Torque filler valve assembly 50 - 100 in•lbs (5.6 - 11.3 N•m).

(j) Install end containing cap of cap and chain assembly (125) on open end of filler valve assembly (100B).

E. L-1 Port Devices

Refer to IPL Fig. 2.

(1) Male altered-connector (30).

(a) Install preformed packing (35) on male altered-connector (30).

(b) Install male altered-connector (30) into regulator body (360, -360A). Torque male altered-connector 75 - 100 in•lbs (8.5 - 11.3 N•m).

(c) Refer to lockwire procedure MS33540 and install Lockwire (Table 701) between male altered-connector (30) and cap screw (245).

10. Final Regulator Assembly (Continued)

E. L-1 Port Devices (Continued)

(2) External threaded reducer (-30A, -30B).

(a) Install preformed packing (35) on external threaded reducer (-30A, -30B).

(b) Install external threaded reducer (-30A, -30B) into regulator body (360, -360A). Torque external threaded reducer 75 - 100 in•lbs (8.5 - 11.3 N•m).

F. L-2 Port Devices

Refer to IPL Fig. 2.

(1) Male connector (20).

(a) Install preformed packing (25) on male connector (20).

(b) Install male connector (20) into regulator body (360, -360A). Torque connector 75 - 100 in•lbs (8.5 - 11.3 N•m).

(2) Flareless tube plug (20A).

(a) Install preformed packing (25) on flareless tube plug (20A).

(b) Install flareless tube plug (20A) into regulator body (360, -360A). Torque flareless tube plug 75 - 100 in•lbs (8.5 - 11.3 N•m).

(c) Refer to lockwire procedure MS33540 and install Lockwire (Table 701) between flareless tube plug (20A) and cap screw (245).

G. L-3 Port Devices

Refer to IPL Fig. 2.

(1) Relief valve (65, -65A).

(a) Apply Thread Sealing Tape (Table 701) on relief valve (65, -65A).

(b) Thread relief valve (65, -65A) into regulator body (360, -360A). Torque relief valve 75 - 100 in•lbs (8.5 - 11.3 N•m).

11. Cylinder Charging Procedure

Refer to Fig. 704 and IPL Fig. 2.

A. Remove cap of cap assembly (75) from filler valve assembly (80) or cap of cap and chain assembly (125) from filler valve assembly (100, 100B).

B. Attach Oxygen Charging Fitting (Table 703) to filler valve assembly (80, 100, -100A, -100B, -420A) or charging valve assembly (-460).

11. Cylinder Charging Procedure (Continued)

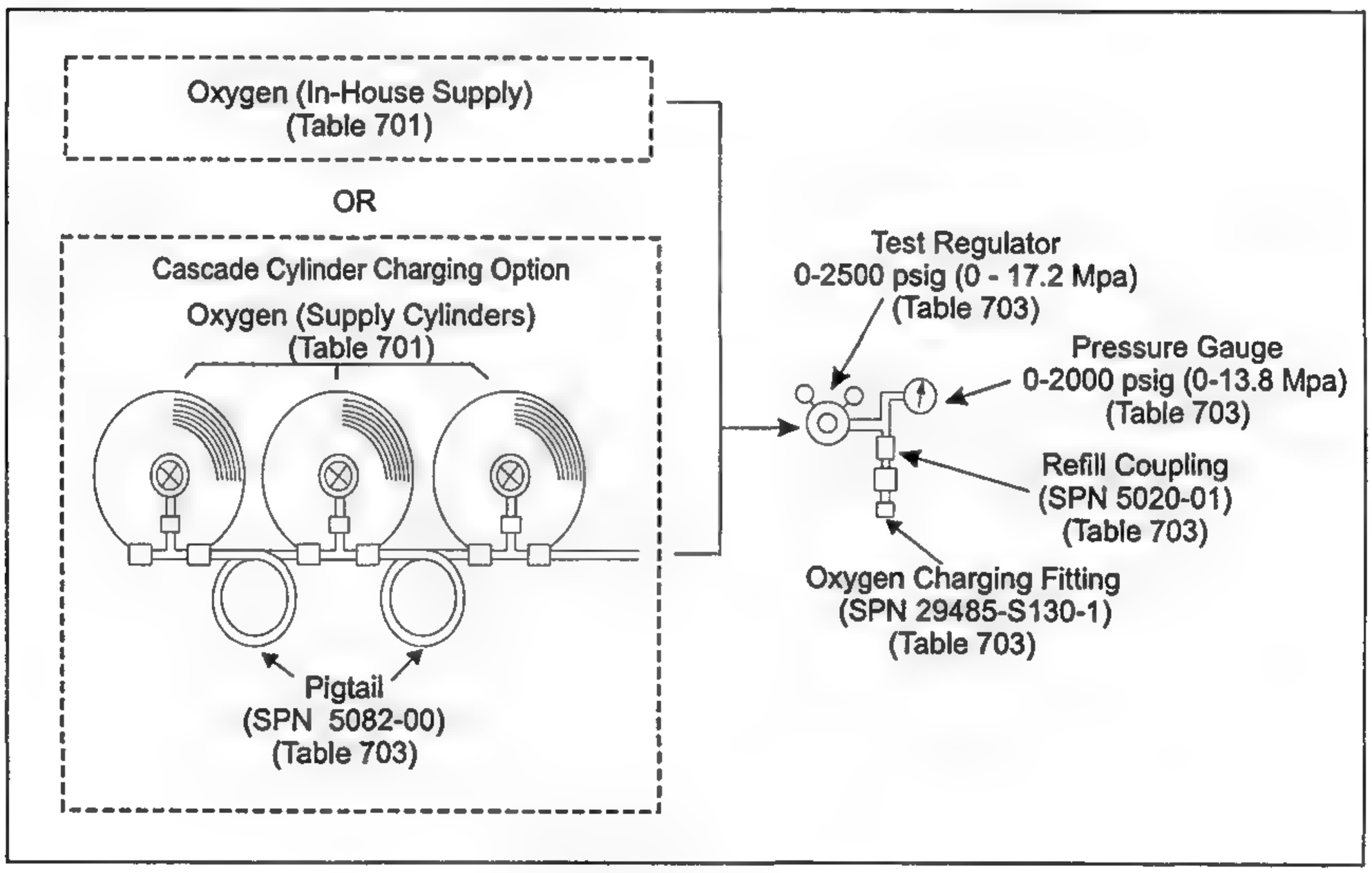
C. Flow oxygen at a rate **not to exceed 300 psig (2.07 MPa) per minute.** When the Pressure Gauge (Table 703) on the CRA charging setup is 1800 - 1850 psig (12.4 - 12.8 MPa), stop the flow of oxygen into the CRA. Let the cylinder cool to room temperature and make sure that the pressure is correct for the type of cylinder being charged.

1800 psig (12.4 MPa) for a DOT-3AA-1800 steel cylinder at 70 °F (21 °C).

1850 psig (12.8 MPa) for a DOT-3HT-1850 steel cylinder at 70 °F (21 °C).

1850 psig (12.8 MPa) for a composite cylinder at 70 °F (21 °C).

Refer to Table 705 for pressure and temperature data at temperatures other than 70 °F (21 °C).



CRA Charging Setup
Figure 704

Table 705
Pressure and Temperature Data

TEMPERATURE °F (°C)	NOMINAL 1800 psig FILLING PRESSURE psig (MPa)	NOMINAL 1850 psig FILLING PRESSURE psig (MPa)
100 (37.8)	1935 (13.34)	1985 (13.69)
95 (35.0)	1910 (13.17)	1960 (13.51)
90 (32.2)	1890 (13.03)	1935 (13.34)
85 (29.4)	1870 (12.89)	1910 (13.17)
80 (26.7)	1850 (12.76)	1885 (13.00)
75 (23.9)	1825 (12.58)	1865 (12.86)
70 (21.1)	1800 (12.41)	1850 (12.76)
65 (18.3)	1775 (12.24)	1825 (12.58)
60 (15.6)	1750 (12.07)	1800 (12.41)
55 (12.8)	1730 (11.93)	1775 (12.24)
50 (10.0)	1710 (11.79)	1750 (12.07)

11. Cylinder Charging Procedure (Continued)

WARNING: FAILURE TO FULLY DISCHARGE THE CRA CHARGING SETUP OF OXYGEN PRIOR TO DISASSEMBLY OF ANY PART MAY CAUSE SERIOUS PERSONAL INJURY OR DEATH.

D. Discharge all oxygen from the CRA charging setup.

E. Remove CRA from CRA charging setup.

F. Brush on Leak Test Solution (Table 701) on mating threads between regulator assembly (-1 thru -1M, IPL Fig. 2) and cylinder assembly (1 thru -1D, -2 thru -2E, IPL Fig. 3). Leakage at these mating threads must be zero. Leakage, if present, will be indicated by the presence of bubbles at the mating thread surface.

12. Storage

A. Place the 898 Series CRA in a clean polyethylene bag and seal it to protect the CRA from dust and dirt.

B. Store in a cool area, away from sources of high heat and humidity.

FITS AND CLEARANCES

Torque values, critical to the assembly and operation of the 898 Series Cylinder and Regulator Assemblies, are listed in Table 801.

Table 801
Torque Values

IPL REFERENCE		NOMENCLATURE	TORQUE VALUES	
FIG. No.	ITEM No.		U.S in•lbs	METRIC N•m
1	10, -10A, 20, -20A, -20B, -20C -20D, -20G, -20H	Regulator Assembly	480-600 (408-514) (Note 1)	54.2-67.8 (46.1-58.1) (Note 1)
1	-10B, -10C -20E, -20F	Regulator Assembly	800-955 (689-822) (Note1)	90.4-107.9 (77.7-92.8) (Note 1)
2	5	Gauge, Pressure	75-100	8.5-11.3
2	10	Transducer, Pressure	75-100	8.5-11.3
2	20	Connector, Male	75-100	8.5-11.3
2	20A	Plug, Flareless Tube	75-100	8.5-11.3
2	30	Connector, Male Altered	75-100	8.5-11.3
2	-30A, -30B	Reducer, External Threaded	75-100	8.5-11.3
2	40	Fitting, Adapter	75-100	8.5-11.3
2	-40A	Connector, Male Altered	75-100	8.5-11.3
2	50	Spacer, Burst Disc	75-100	8.5-11.3
2	65	Valve Assy, Press Relief	75-100	8.5-11.3
2	-65A	Valve, Relief-Overboard Vent	75-100	8.5-11.3
2	80	Valve Assy, Filler	50-100	5.6-11.3
2	-85	Core, Valve	4.5-5.0	0.51-0.56
2	100, 100A, 100B	Valve Assy, Filler	50-100	5.6-11.3

Note 1: Torque values given in parenthesis are for a 13 in. (33 cm) long torque wrench attached to the Offset Spanner Wrench (SPN 898940-S91-1). Equivalent tools may be used, however the proper amount of applied torque must be calculated for the tools being used.

Table 801 (Continued)
Torque Values

IPL REFERENCE		NOMENCLATURE	TORQUE VALUES	
FIG. No.	ITEM No.		U.S in•lbs	METRIC N•m
2	-105	Core, Valve	4.5-5.0	0.51-0.56
2	140	Screw, Pan Head	3.0-4.0	0.3-0.5
2	170	Screw, Fillister Head	5.0-9.0	0.6-1.02
2	215	Setscrew, Cone Point	5.0-10	0.6-1.1
2	245	Screw, Socket Head Cap	12-15	1.4-1.7
2	335	Tube Assy	75-100	8.5-11.3
2	-380	Screw, Pan Head	3.0-4.0	0.3-0.5
2	385	Transducer, Temp/Press	275-300	31.1-33.9
2	420	Plug, Flareless Tube	75-100	8.5-11.3
2	-420A	Valve Assy, Filler	75-100	8.5-11.3
2	-430	Core, Valve	4.5-5.0	0.51-0.56
2	-460	Valve Assy, Charging	75-100	8.5-11.3
2	465	Core, Valve	4.5-5.0	0.51-0.56

Note 1: Torque values given in parenthesis are for a 13 in. (33 cm) long torque wrench attached to the Offset Spanner Wrench (SPN 898940-S91-1). Equivalent tools may be used, however the proper amount of applied torque must be calculated for the tools being used.

SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT

Special tools, fixtures and test equipment required for disassembly, cleaning, checking, repair or assembly of the 898 Cylinder and Regulator Assembly (CRA) are shown in Table 901. Special tools (Fig. No. in "NOMENCLATURE" column) required for disassembly, or assembly of the 898 Series CRA are shown in Figures 901 through 914. Tools and equipment used in this manual not shown in Table 901 are standard oxygen shop tools and equipment. Unless otherwise noted, one of each item is required. Equivalent tools, fixtures or test equipment may be substituted for the listed items.

Table 901
Special Tools, Fixtures and Test Equipment

NOMENCLATURE	PART NAME or PART NUMBER	MANUFACTURER (w/ VENDOR CODE)
Test Plug (0.375 in. - 24 UNF Thread)	Flareless Plug MS 21913J3	Local Vendor (V96906
Preformed Packing (Used with Test Plug MS21913J3)	MS9385-03	Local Vendor (V96906)
	18091-00	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Test Plug (3 required) (0.438 in. - 20 UNF Thread)	10009813	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (3 required) (Used with Test Plug 10009813)	3-904L308-80	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)
	50740-05	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Flowmeter (1.63 - 16.3 lpm) (38.1 - 381 lpm)	"1110 Series" 1110CG41CBGAA 1110CK42CBGAA	Brooks Instruments Hatfield, PA 19440-3052 USA (V91556)
Test Regulator (0 - 2500 psig (0 - 17.2 MPa)) Outlet Pressure	"44-1100 Series" 44-1114-24	Tescom Corp. Elk River, MN 55330-2245 USA (V5H642)
Test Regulator (0 - 250 psig (0 - 1.72 MPa)) Outlet Pressure	"26-1600 Series" 26-1612-24	Tescom Corp. Elk River, MN 55330-2245 USA (V5H642)

Table 901 (Continued)
Special Tools, Fixtures and Test Equipment

NOMENCLATURE	PART NAME or PART NUMBER	MANUFACTURER (w/ VENDOR CODE)
Pressure Gauge (0 - 160 psig (0 - 1.10 MPa)) (0 - 200 psig (0 - 1.38 MPa)) (0 - 300 psig (0 - 2.07 MPa)) (0 - 2000 psig (0 - 13.8 MPa)) (0 - 3000 psig (0 - 20.7 MPa))	"1403" or "1404 Series	Ametek (US Gauge) Sellersville, PA 18960-2625 USA (V61349)
On/Off Valve (0.250 in. - 18 ANPT Threads)	"P4T" Series B-4P4T4	Whitey Co. Highland Heights, OH 44143 USA (V12623)
Flow Control Valve (2 required) (0.250 in. - 18 ANPT Threads)	"1" Series B-1RF4	Whitey Co. Highland Heights, OH 44143 USA (V12623)
Fractional Tube Adapter (0.250 in. Tube x 0.438 in. - 20 UNF Threads)	"TA-OR-ST" Series B-4-TA-OR-ST	Swagelok Co. Hudson, OH 44236 USA (V0ZLA5)
Plastic Tubing (0.250 in. (6.35 mm) ID x 0.094 in. (2.38 mm) Thick))	Tygon Tubing (R3603 Formulation)	Norton Co. Stow, OH 44224-4306 USA (V61501)
O-Seal Pipe Thread Connector (0.250 in. Tube x 0.125 in. - 27 ANPT Thread)	"OR" Series B-400-1-2-OR	Swagelok Co. Hudson, OH 44236 USA (V0ZLA5)
Tube Adapter (0.250 in. Tube)	"HC-A" Series B-4-HC-A-401	Swagelok Co. Hudson, OH 44236 USA (V0ZLA5)
Soap Film Meter (0-1 cc) (0-10 cc)	 4041 4042	AllTech Associates Inc. Deerfield, IL 60015-1828 USA (V55371)
Push/Pull Gauge (0-10 lbs. (0-44 N))	719-10MRP	Ametek-Chatillon Largo, FL 33773 USA (V1CN79)
Test Plug (2 required) (0.125 in. - 27 ANPT Threads) (Fig. 911)	5500-S58-7	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (2 required) (Used with Test Plug 5500-S58-7)	33537-009	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)

Table 901 (Continued)
Special Tools, Fixtures and Test Equipment

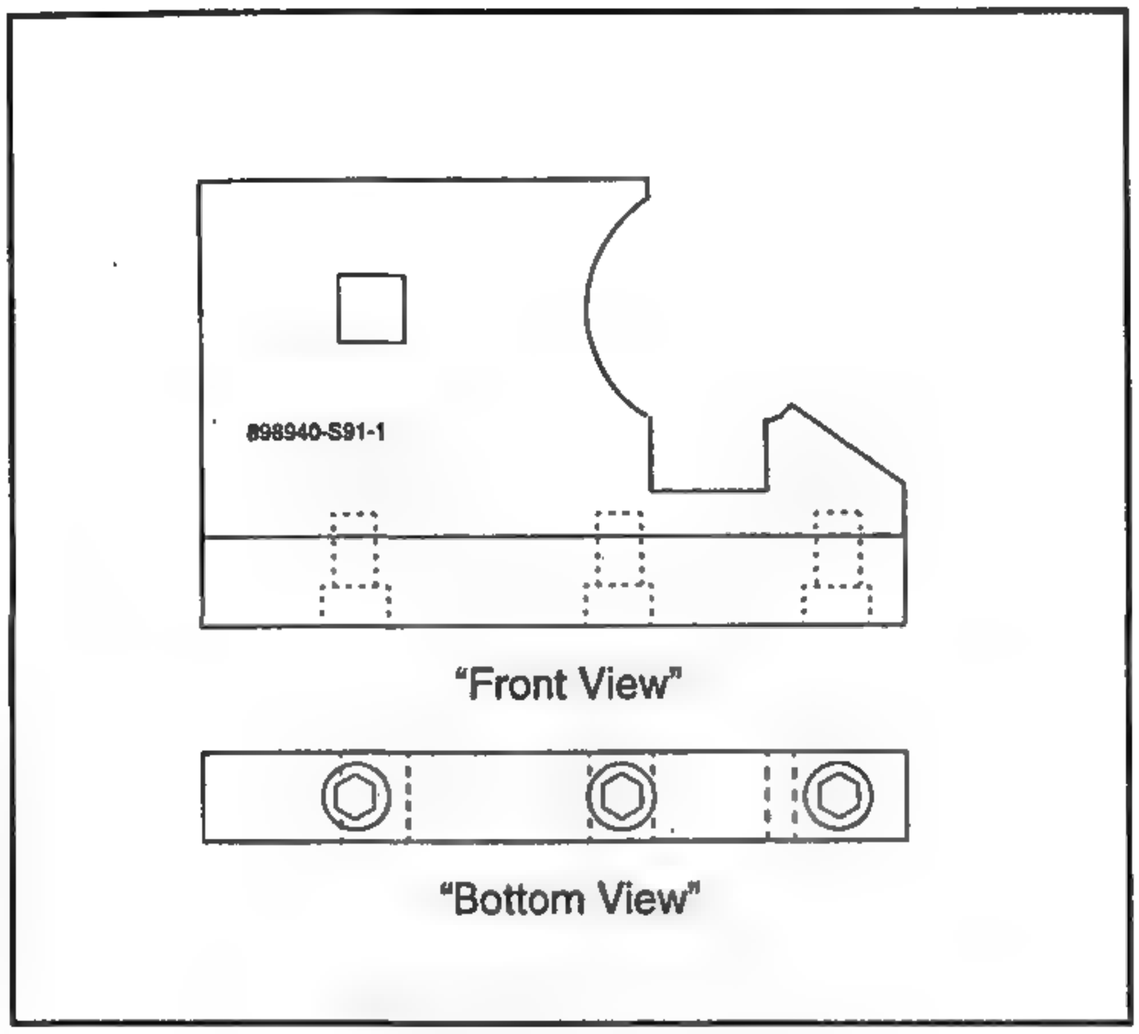
NOMENCLATURE	PART NAME or PART NUMBER	MANUFACTURER (w/ VENDOR CODE)
Regulator Test Fixture (Fig. 912)	803440-S58-10	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packings (1 each required) (Used with Regulator Test Fixture 803440-S58-10)	2-230S604-70 and 2-264S604-70	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)
Regulator Test Adapter (0.750 in. - 16 UNF Threads) (Fig. 913A)	803440-S58-10-8	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (Used with Regulator Test Adapter 803440-S58-10-8)	2-111S604-70	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)
Regulator Test Adapter (1.00 in. - 11½ ANPT Threads) (Fig. 913B)	803440-S58-10-4	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Preformed Packing (Used with Regulator Test Adapter 803440-S58-10-4)	2-119S604-70	Parker-Hannifin Co. Lexington, KY 40512-1751 USA (V02697)
Offset Spanner Wrench (½ in. Drive) (Fig. 901)	898940-S91-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Regulator Assembly Fixture (Fig. 902)	898940-S50-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Adapter (Fixed) (Part of Fig. 902)	899940-S57-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Adapter (Slip On) (Part of Fig. 902)	898940-S57-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Regulator Clamp Adapter (Fig. 903)	898940-S57-3	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Cylinder/Valve Wrench (Fig. 904)	800216-T91-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)

Table 901 (Continued)
Special Tools, Fixtures and Test Equipment

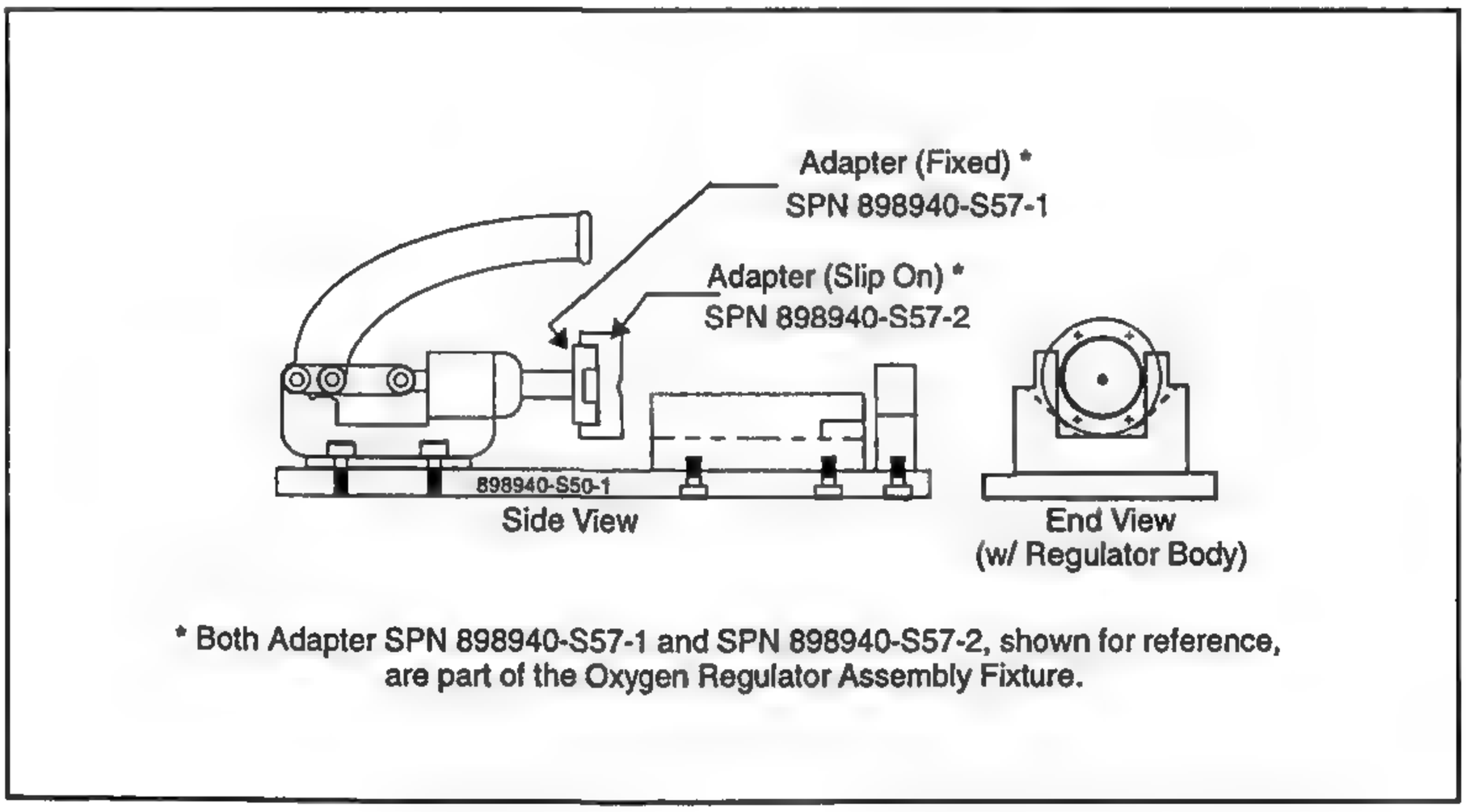
NOMENCLATURE	PART NAME or PART NUMBER	MANUFACTURER (w/ VENDOR CODE)
Disc Drive Set (Fig. 905)	803949-S52-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Nesting Plate (Fig. 906)	803949-S57-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Pneumatic Bench Vise	Model BV-101-P P/N 58634	Getz Fire Equipment Peoria, IL 61602-1711 USA (V58013)
Plastic Rod	0.250 in. (6.35 mm) Diameter x 5 in. (13 mm) Length	Local Vendor
Protective Caps 1.188 in. (3.018 cm) ID 1.125 in. (2.858 cm) ID 1.250 in. (3.175 cm) ID	 C234 C336 C340	Alliance Plastics Inc. Erie, PA 16510-3045 USA (V34669)
Liquid/Vapor Degreaser System	MSR-216LE	Baron Blakeslee Long Beach, CA 90813 USA (V0FDJ7)
Ultrasonic Cleaning System	TH1418-9	Mass Technology PO Box 795-T East Moline, IL 61244-0795 (USA) Facsimile: 309-755-1121
Stainless Steel Tubing	0.250 in. (6.35 mm) OD x 0.035 in. (0.889 mm) Wall or 0.375 in. (9.53 mm) OD x 0.035 in. (0.889 mm) Wall	Local Vendor
Wire Brush	1.5 in. (38 mm) Diameter	Local Vendor
Bright Inspection Light	IL-24	Titan Tool and Supply Co. Buffalo, NY 14216-1784 USA (V51679)
Spray Gun	Model 19	Binks Manufacturing Co. Franklin Park, IL 60131-2887 USA (V07334)
Cylinder Hanger (0.750 - 16 UNF Threads)	SK87-117-08	Bolero Industries Santa Fe Springs, CA 90670 USA (V0TRZ6)

Table 901 (Continued)
Special Tools, Fixtures and Test Equipment

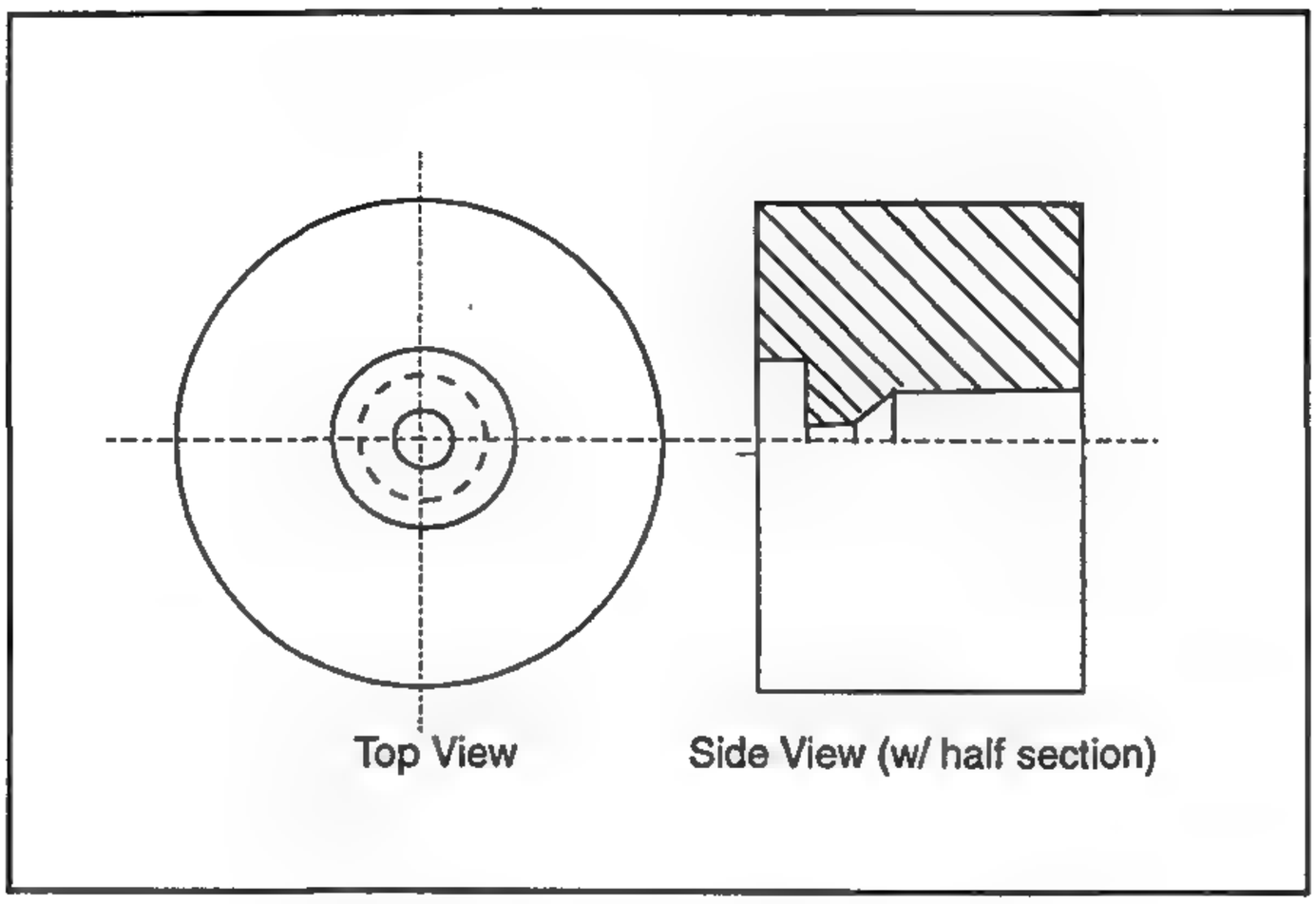
NOMENCLATURE	PART NAME or PART NUMBER	MANUFACTURER (w/ VENDOR CODE)
Cylinder Hanger (1.00 - 11½ ANPT Threads)	PP1005-00	Hecker Tools Mukwonago, WI 53149 USA Facsimile: 414-363-9473
Crowfoot Adapter	0.625 in. (16 mm) Nut Size	Local Vendor
Torque Wrench (0-6 in•lbs (0 - 0.68 N•m))	SL-S	Seekonk Manufacturing Co. Seekonk, MA 02771 USA (V53205)
Refill Coupling	5020-01	Scott Aviation Lancaster, NY 14086-9502 USA V53655)
Pigtail	5082-00	Scott Aviation Lancaster, NY 14086-9502 USA V53655)
O-Ring Stylus (Fig. 907A)	803946-S52-1-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
O-Ring Stylus (Fig. 907B)	803946-S52-1-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Seat Installation Tool (Fig. 908)	803946-S52-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Retainer Ring Assembly Tool (Fig. 909A)	803946-S53-1-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Retainer Ring Assembly Tool Pusher (Fig. 909B)	803946-S53-1-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Crowfoot Adapter (0.750 in. (19 mm) Nut Size) (Fig. 910)	898940-S91-2	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)
Oxygen Charging Fitting (Fig. 914)	29485-S130-1	Scott Aviation Lancaster, NY 14086-9502 USA (V53655)



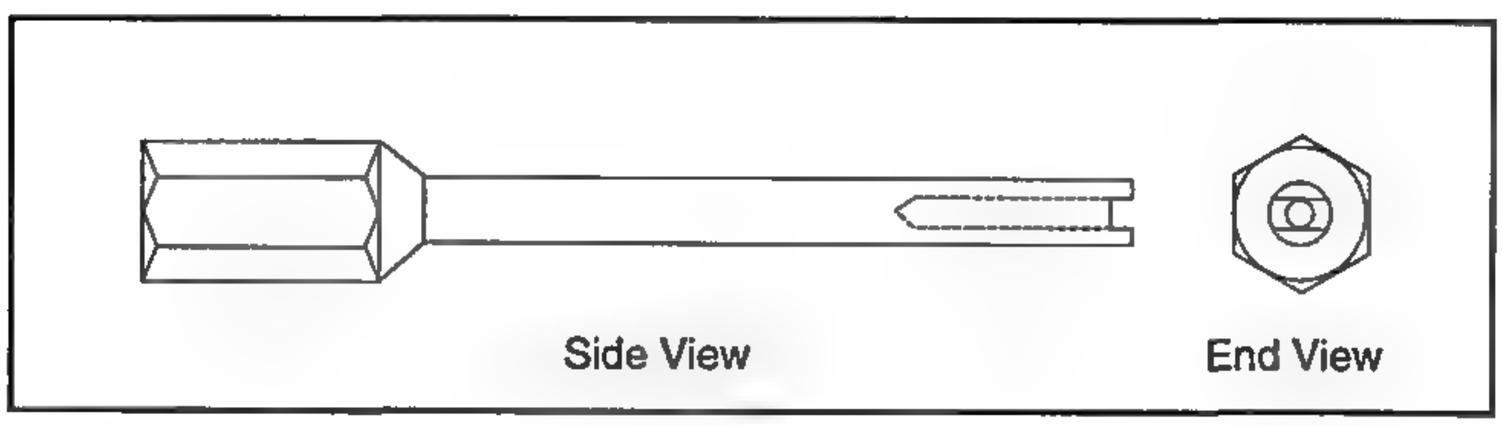
Offset Spanner Wrench
(SPN 898940-S91-1)
Figure 901



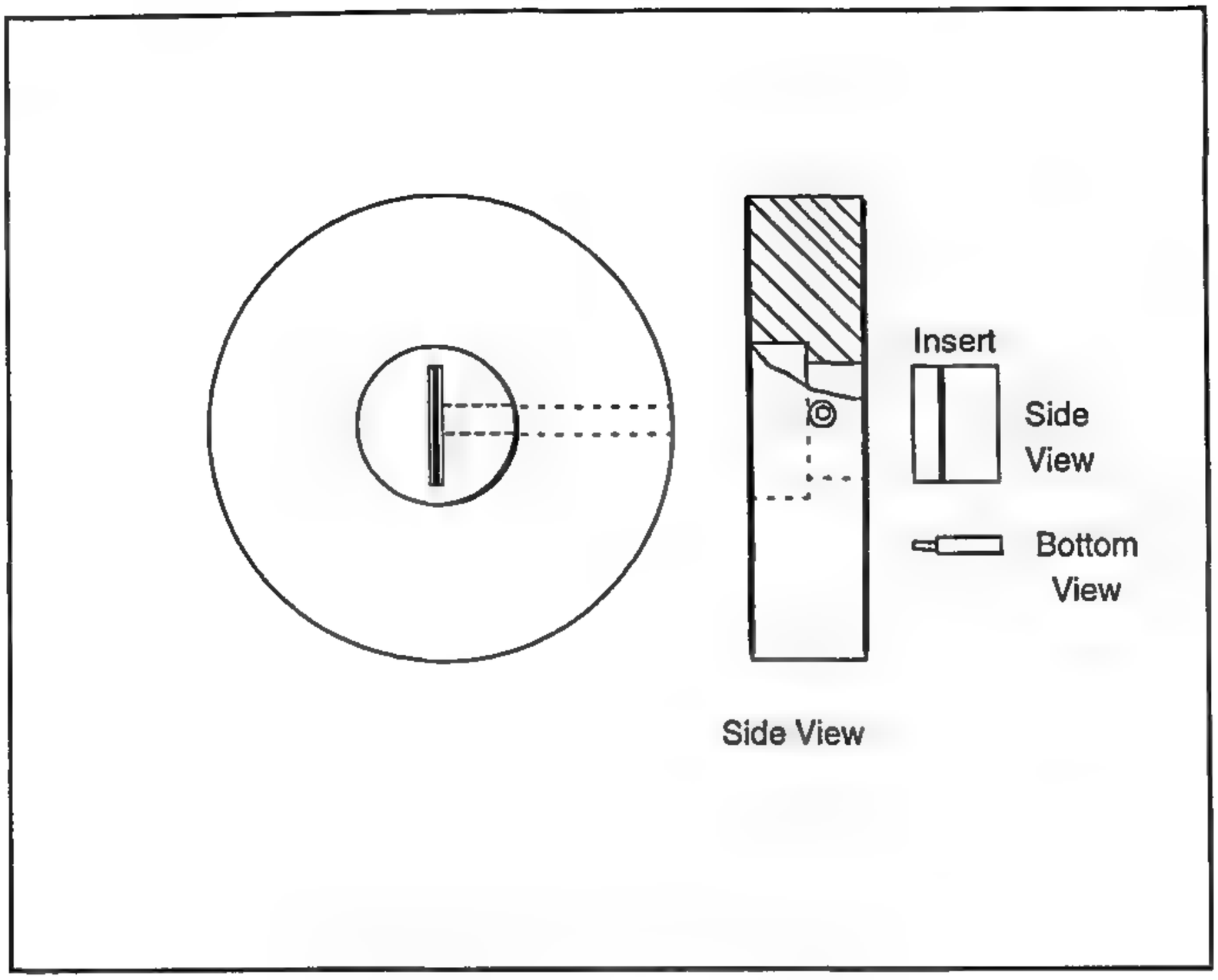
* Both Adapter SPN 898940-S57-1 and SPN 898940-S57-2, shown for reference, are part of the Oxygen Regulator Assembly Fixture.



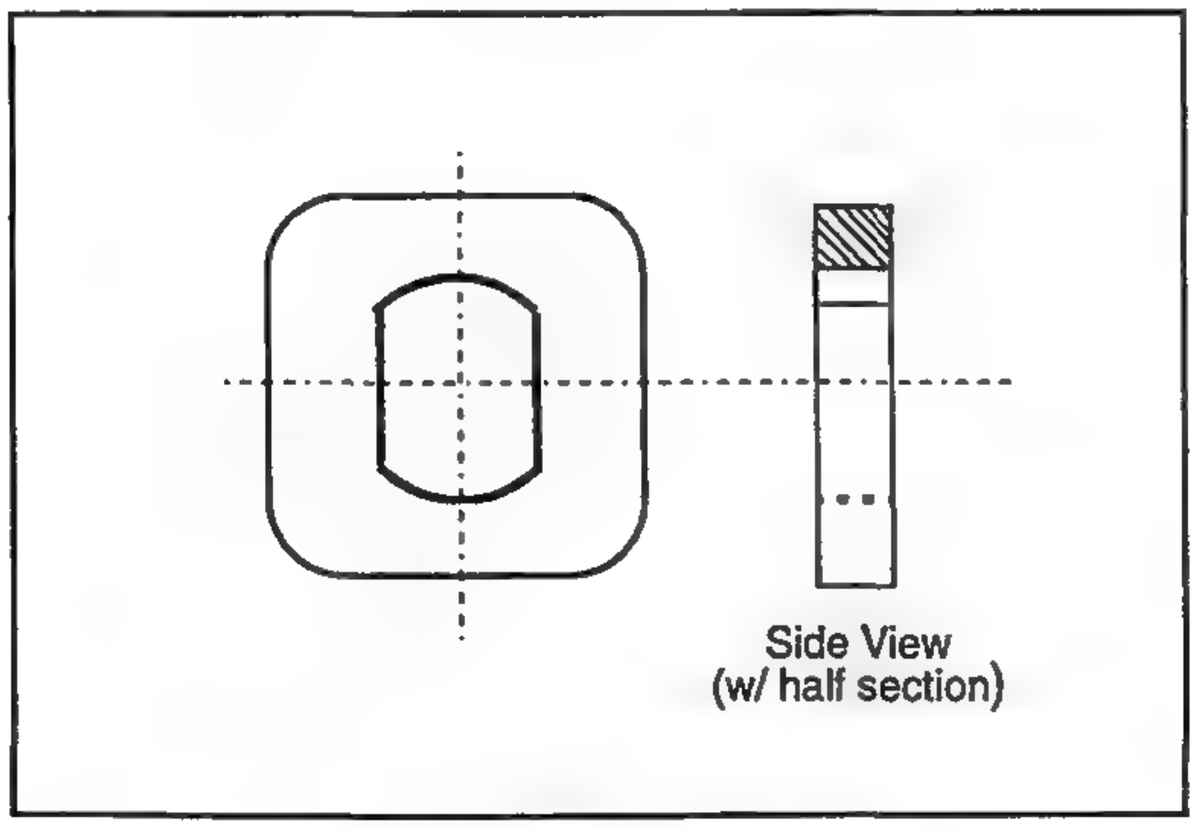
Oxygen Regulator Clamp Adapter
(SPN 898940-S57-3)
Figure 903



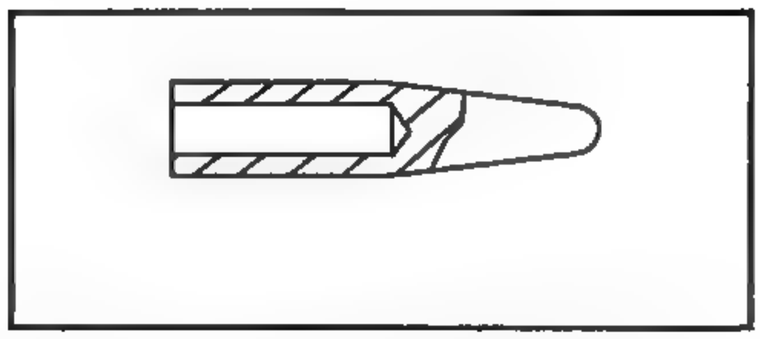
Cylinder/Valve Wrench (SPN 800216-T91-1)
Figure 904



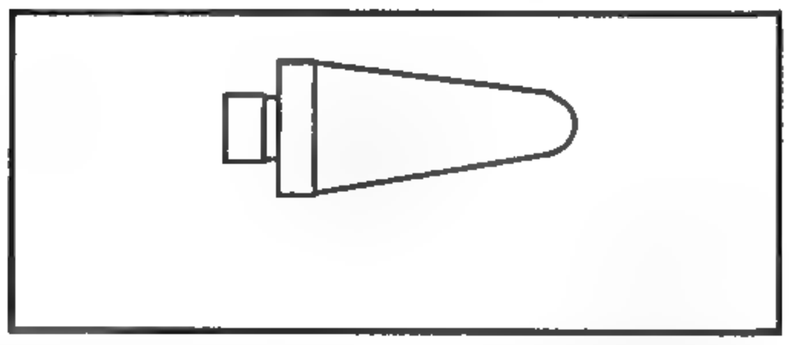
Disc Drive Set (SPN 803949-S52-1)
Figure 905



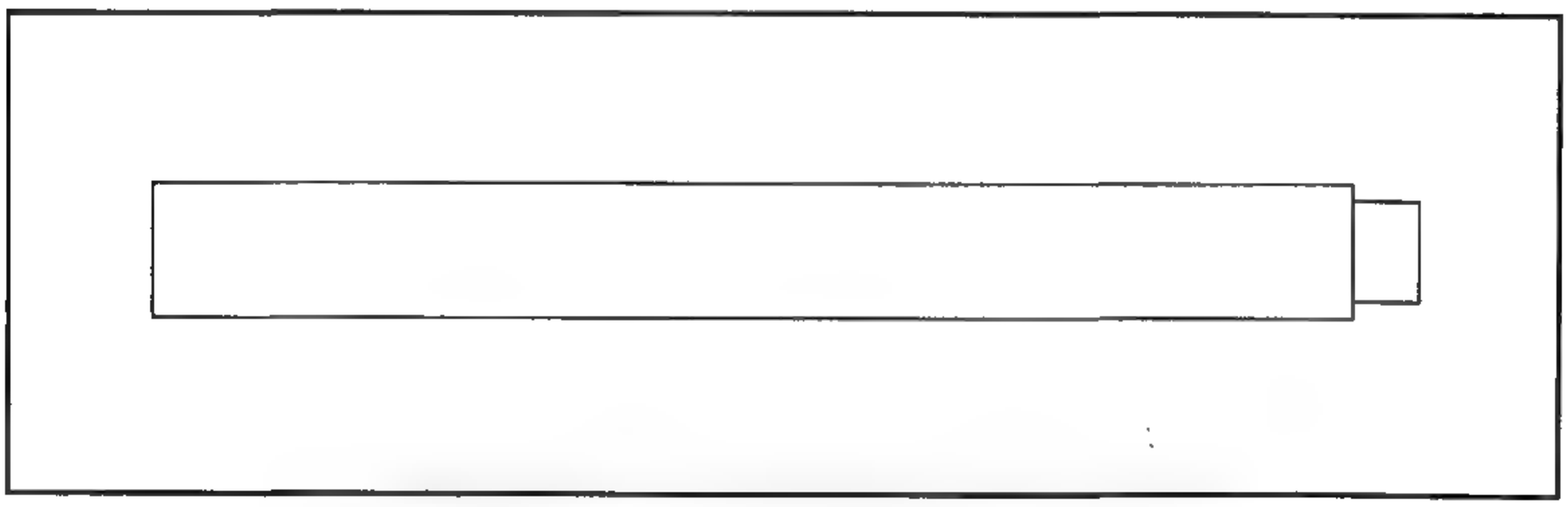
Nesting Plate (SPN 803949-S57-1)
Figure 906



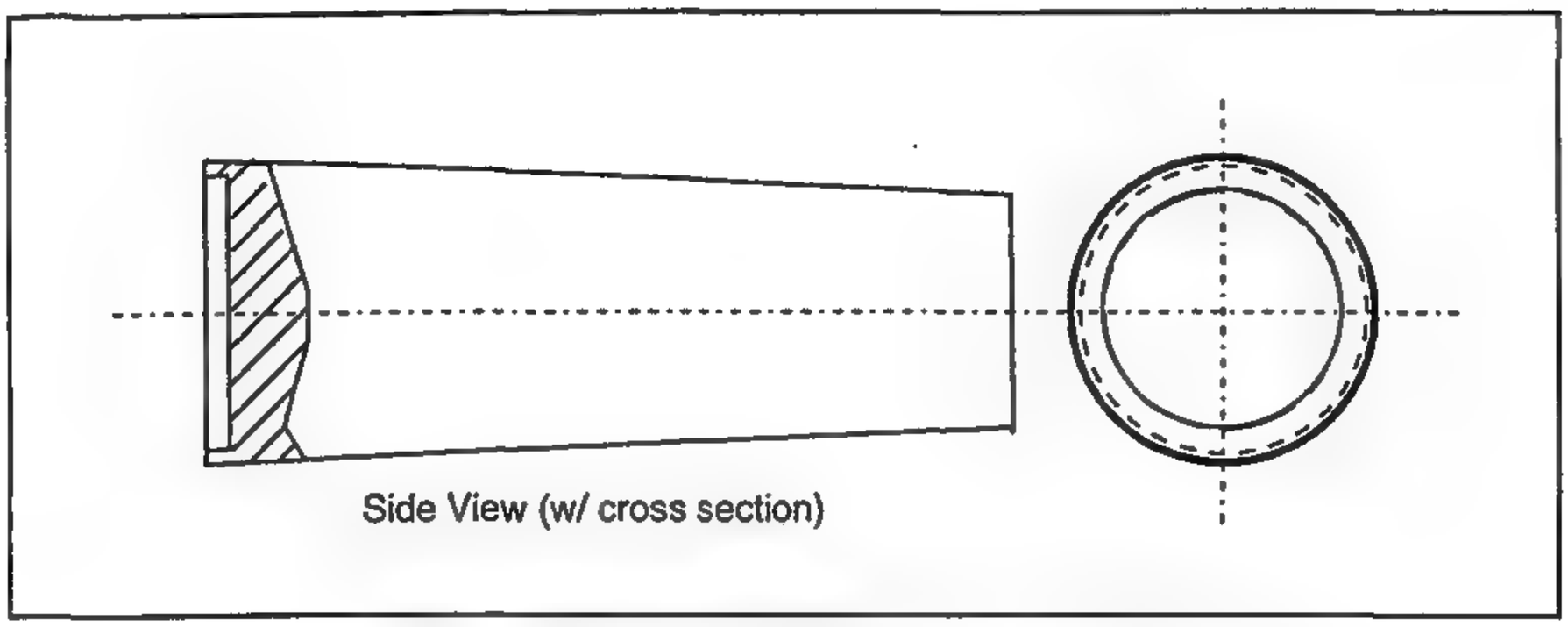
O-Ring Stylus (SPN 803946-S52-1-1)
Figure 907A



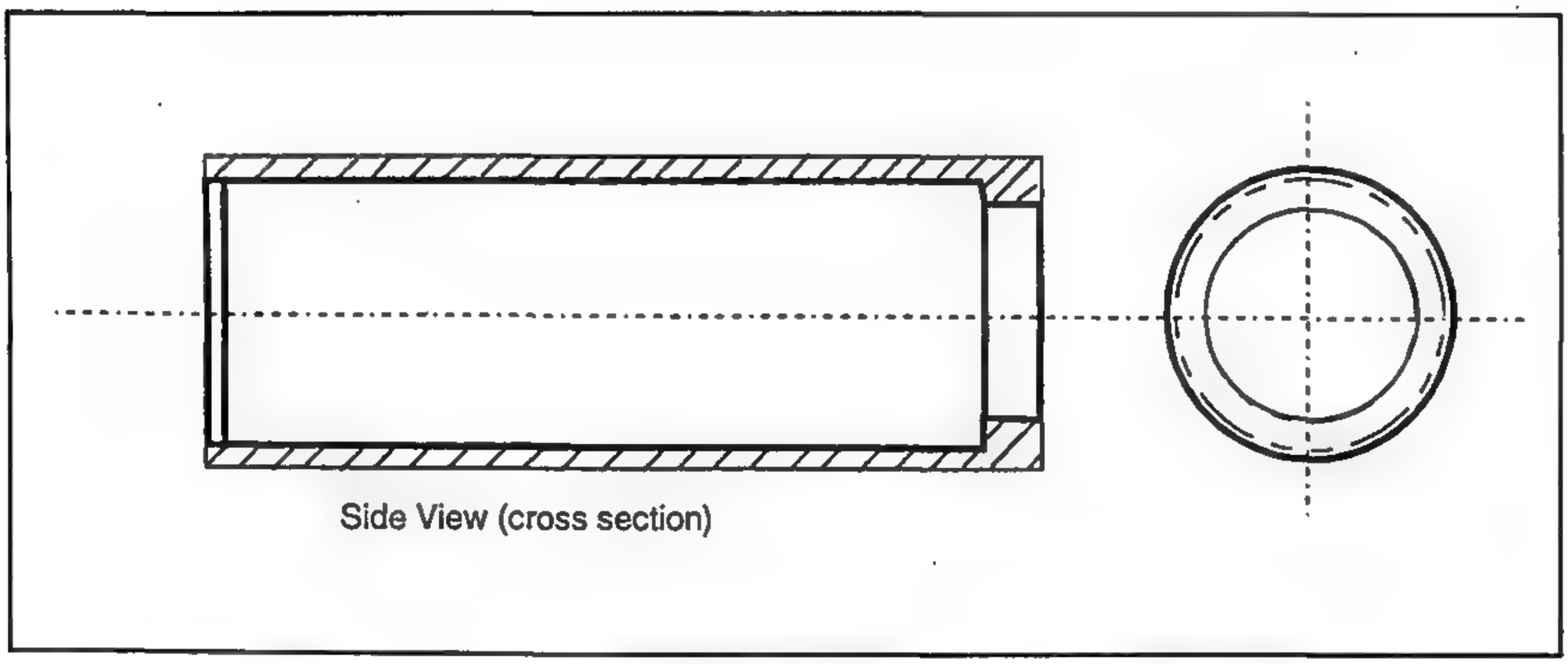
O-Ring Stylus (SPN 803946-S52-1-2)
Figure 907B



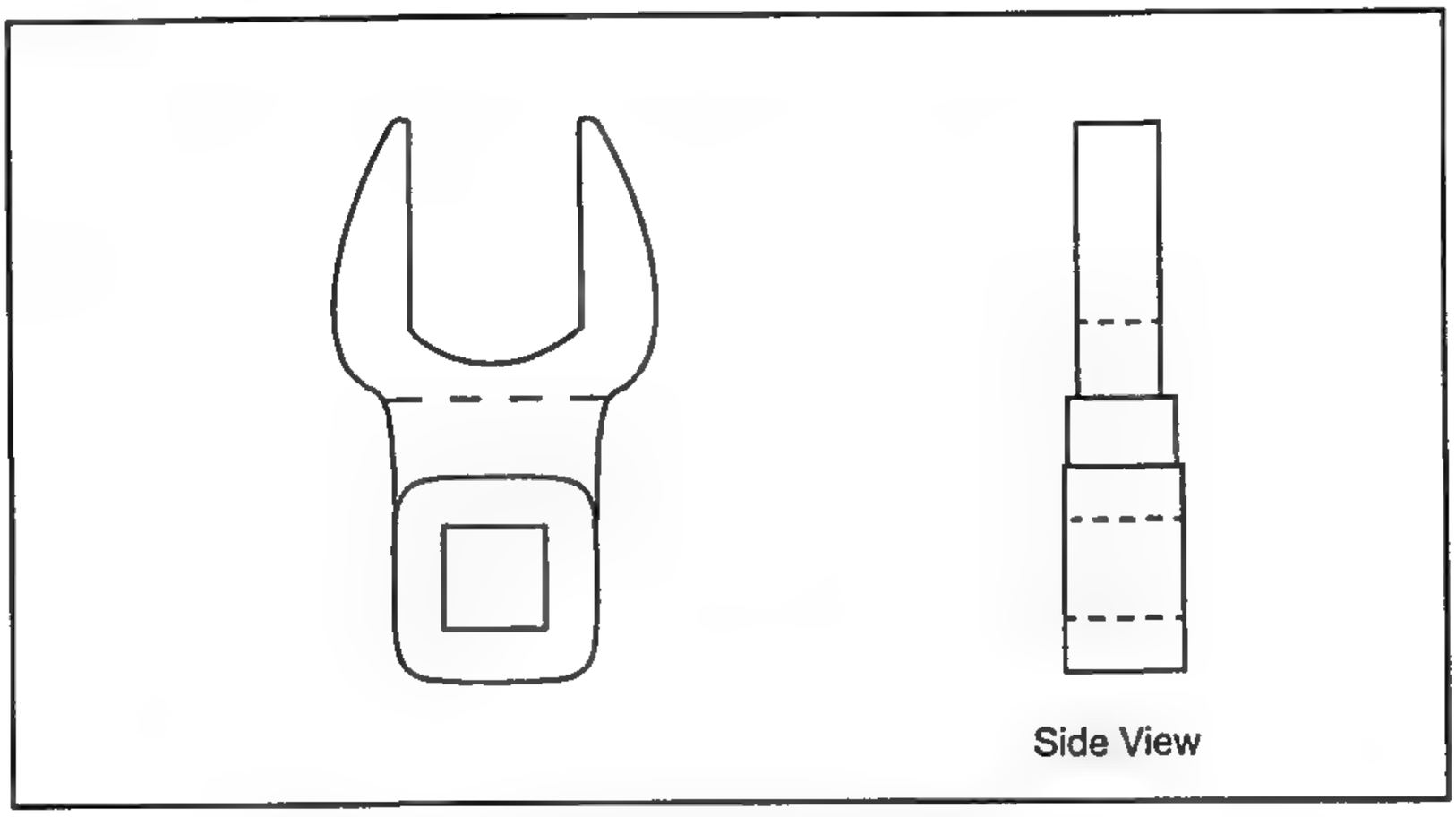
Seat Installation Tool (SPN 803946-S52-2)
Figure 908



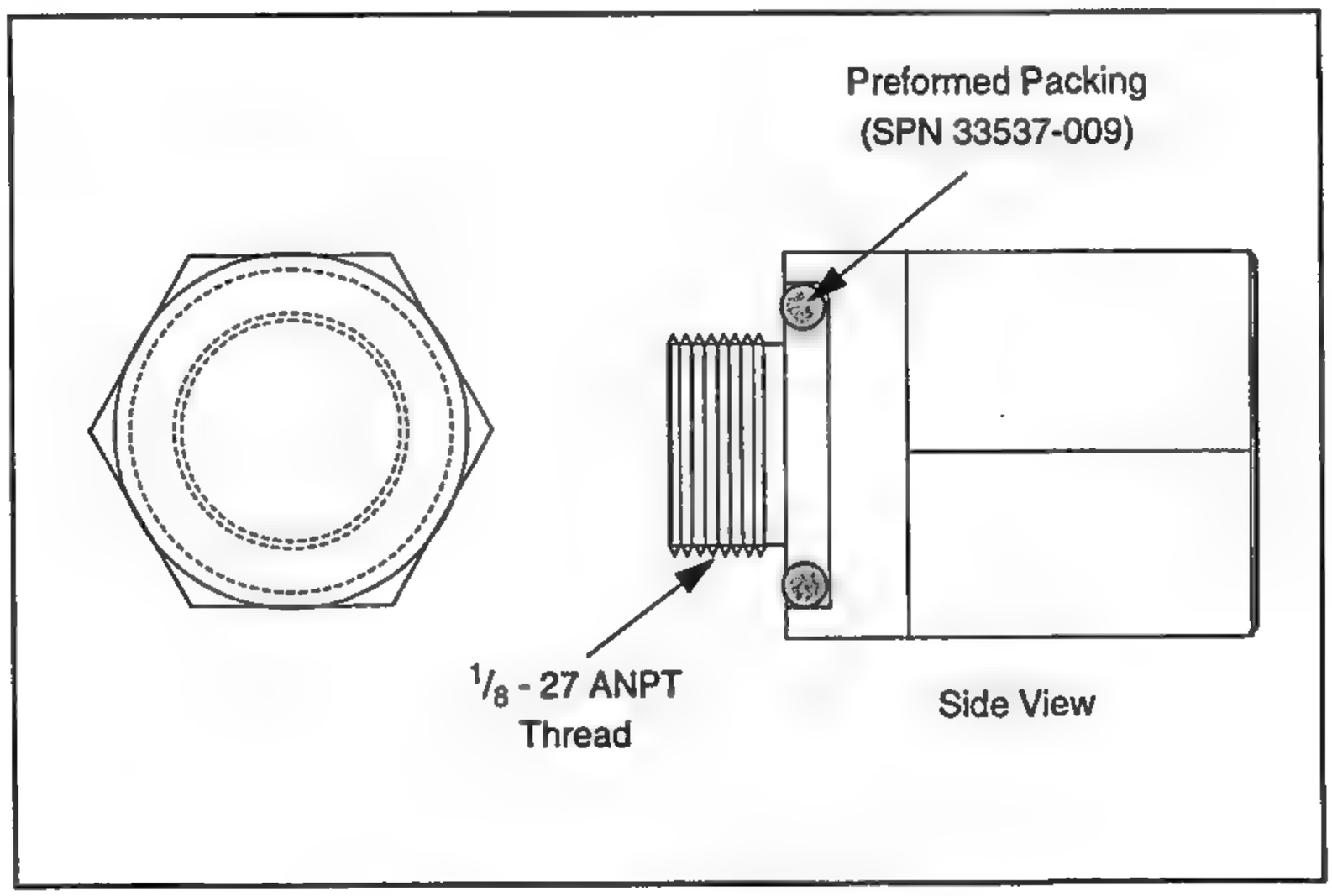
Retainer Ring Assembly Tool (SPN 803946-S53-1-1)
Figure 909A



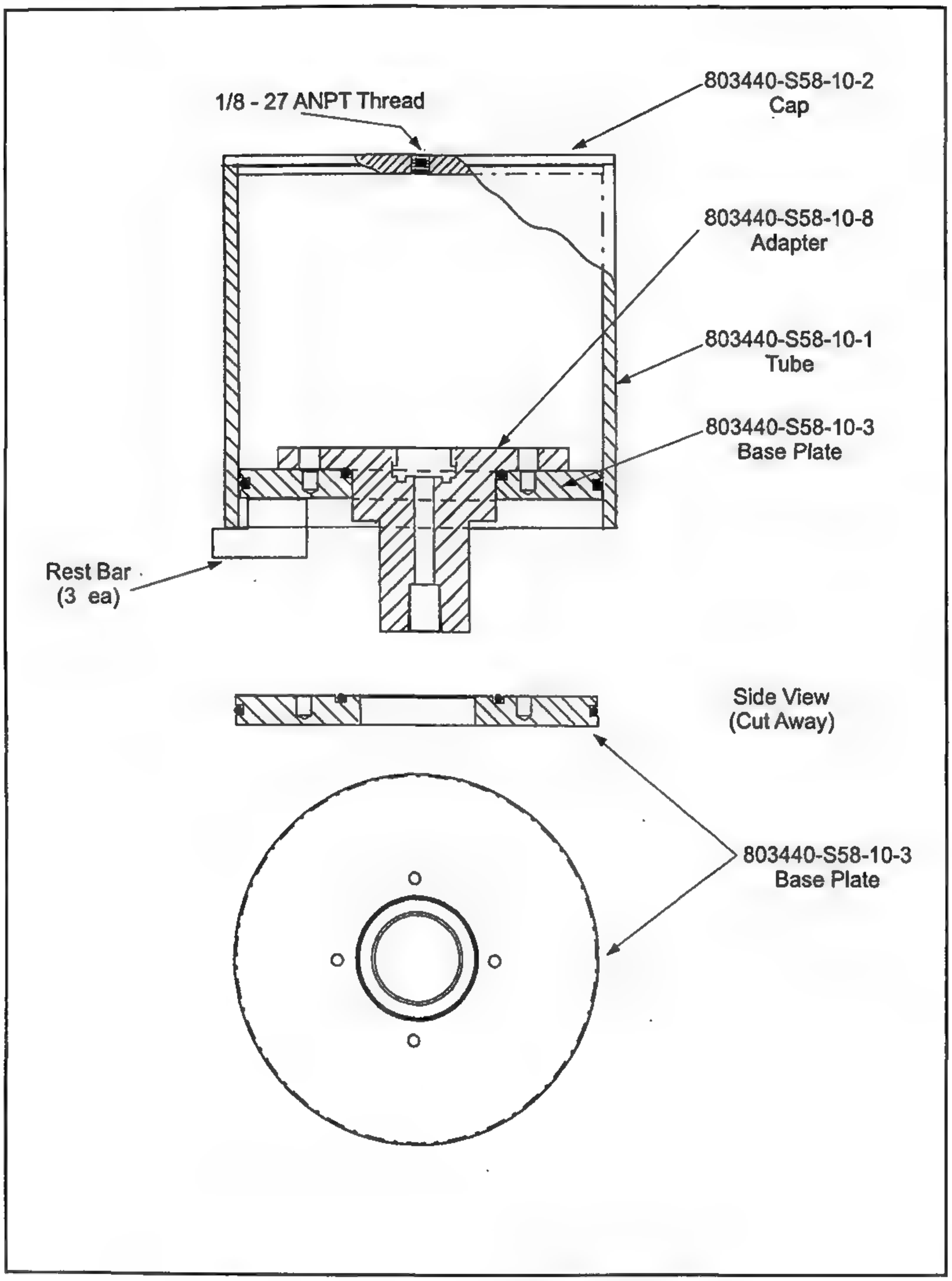
Retainer Ring Assembly Tool Pusher (SPN 803946-S53-1-2)
Figure 909B



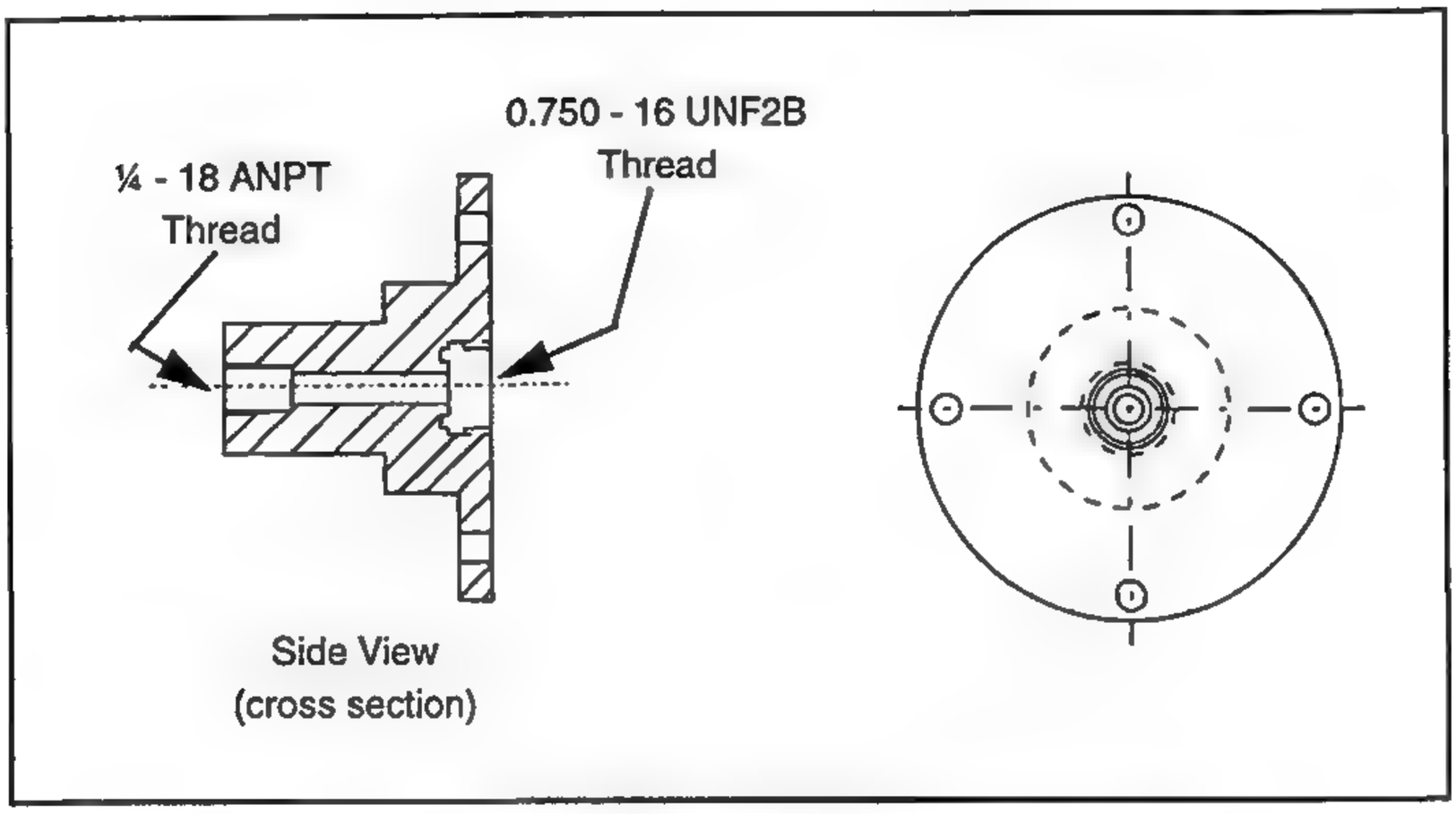
Crowfoot Adapter $^{3}/_{4}$ in. (SPN 898940-S91-2)
Figure 910



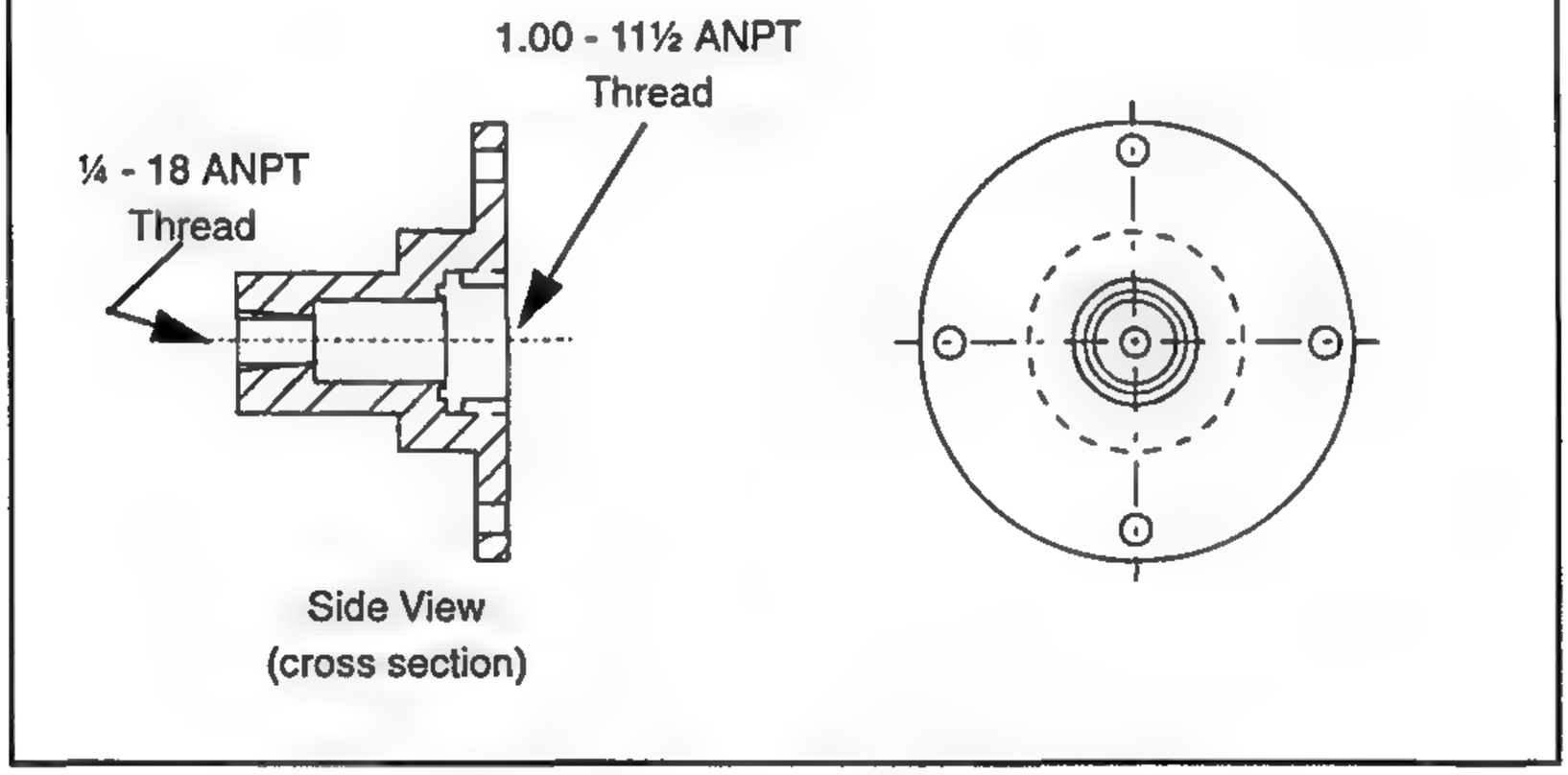
Test Plug (SPN 5500-S58-7)
Figure 911



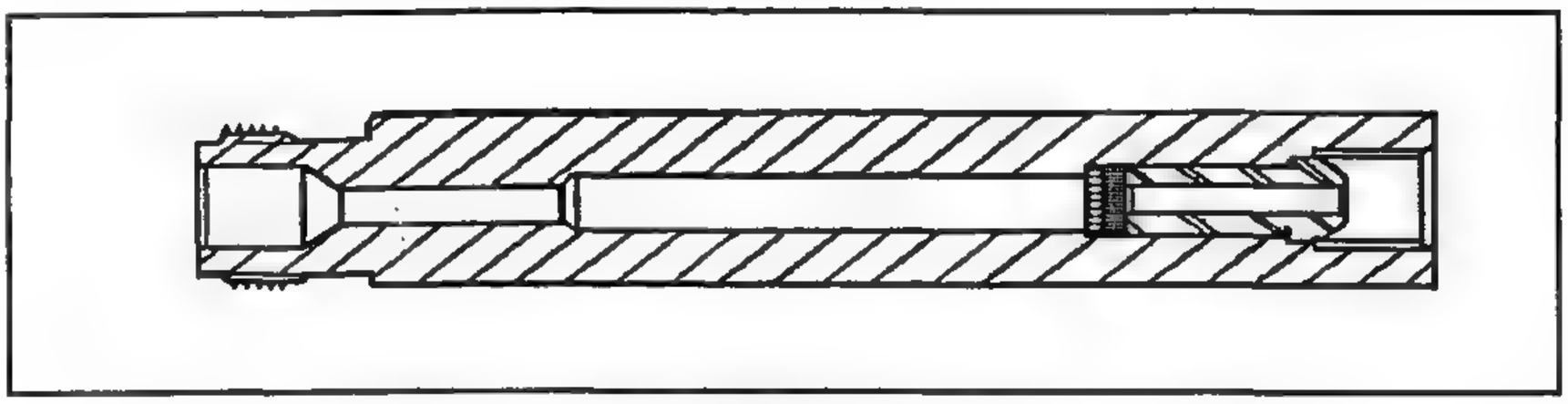
Regulator Test Fixture (SPN 803440-S58-10)
Figure 912



Regulator Test Adapter (SPN 803440-S58-10-8)
Figure 913A



Regulator Test Adapter (SPN 803440-S58-10-4)
Figure 913B



Oxygen Charging Fitting (SPN 29485-S130-1)
Figure 914

ILLUSTRATED PARTS LIST

1. Introduction

This Illustrated Parts List section shows the illustrations and the authorized replacement parts for the 898 Series Cylinder and Regulator Assemblies (CRA).

A. How To Use This Section:

(1) If you do not know the part number you need:

(a) Find the part in the applicable figure

(b) Note the ITEM number used for the part

(c) Use the ITEM number to find the authorized replacement part number.

(2) If you know the part number, refer to the figure to be sure that the part illustration is the same as the part that you need.

B. Numerical Index

The Numerical Index is used to locate parts in the unit when only the part number is known. The Numerical Index provides a cross reference of numbers that include: Airline Stock number, Figure #, Item #, and the number of parts required.

The character-sort-order for a part number is: dashes first, letters A thru Z second, and then numbers 0 thru 9.

C. Description of the Illustrated Parts List Entries

This section describes the information found in the Illustrated Parts List (IPL)

(1) FIG. ITEM

(a) Items not Illustrated

Items that are not shown in the figure have a dash in front of the item number.

(b) Alpha Variant Item Numbers

Alpha variants that are A-Z (except I and O) added after the item number show configuration differences in items, Optional Parts, parts that have had product improvement, and added items.

(2) PART NUMBER

The numbers in this column are the part numbers given by Scott to index all the items in the assembly, or are the part number of the original manufacturer. If a part number that Scott gives an item is different than the supplier part number, the supplier number is shown in the PART NUMBER column and the Scott number (SPN XXXXX) is in the NOMENCLATURE column.

1. Introduction (Continued)

C. Description of the Illustrated Parts List Entries (Continued)

(2) PART NUMBER (Continued)

Some part numbers in this column are a SERIES part number. This SERIES part number provides a method for formulating a complete part number that may not be listed in this manual. Refer to Figure 1001 (Configuration Matrix) for an illustration that shows how to formulate a part number for a Cylinder and Regulator Assembly.

(3) AIRLINE STOCK NUMBER

This column has space available for a number, up to eleven characters in length, given by the airline.

(4) NOMENCLATURE

This column has the discription of the part and may contain the following:

(a) Level of Indenture

This information shows the relationship of one part to another. An example is shown:

123 (Assembly Number)

- Assembly Item
- Subassembly Top Number
- Attaching Parts for the Subassembly Top Number or Assembly Item
***

- - Sub-Subassembly Top Number
- - Attaching Parts for the Sub-Subassembly Top No. or Subassembly
***

- - Subassembly Item

NOTE: The three asterisks are used to separate the attaching parts of one Item from another Item.

(b) Abbreviations

The abbreviations in this column are shown in the List of Abbreviations in the INTRODUCTION section of this manual.

(5) EFF. CODE

When the IPL applies to more than one top assembly, each top assembly is identified with an alpha code (e.g., A, B, C, etc.). If a part number or subassembly is identified with an alpha code, that part can only be used with the top assembly that has that EFF. CODE.

1. Introduction (Continued)

C. Description of the Illustrated Parts List Entries (Continued)

(5) EFF. CODE (Continued)

Any part or subassembly that does not have an EFF. CODE can be used on any top assembly.

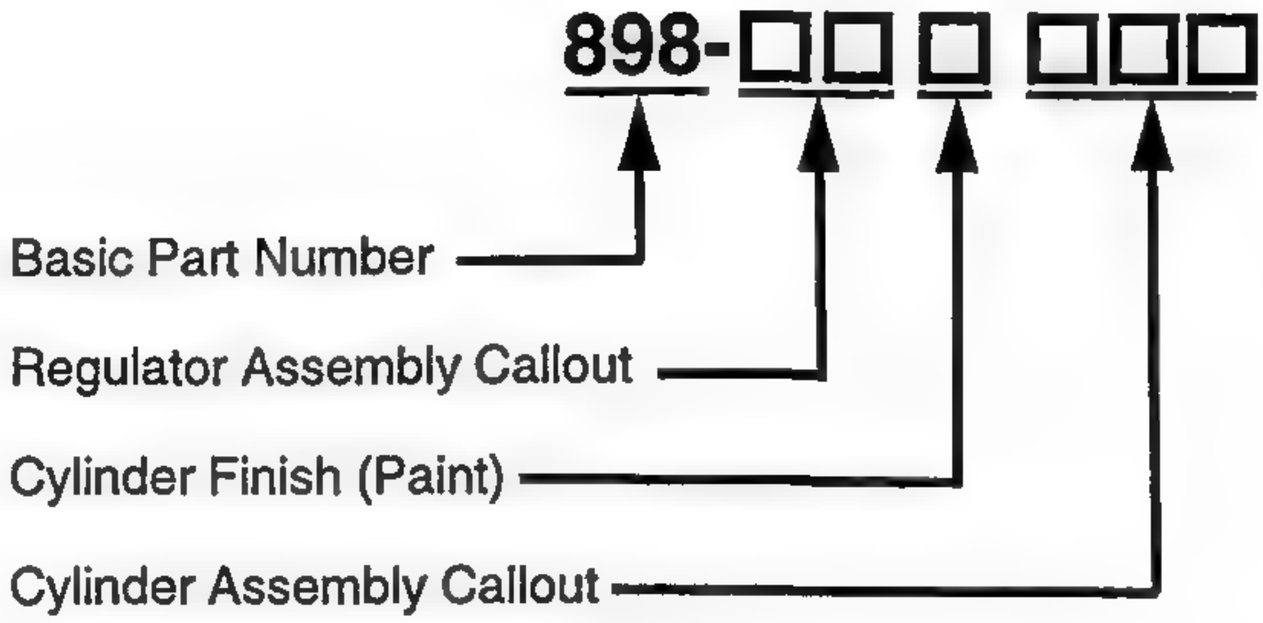
(6) UNITS PER ASSEMBLY

This column shows the number of parts that are used in the assembly.

D. Vendor Codes

The following is a list of the vendors that supply items in this section of the manual:

CODE	NAME AND ADDRESS
V02697	Parker-Hannifin Co. Lexington, KY 40512-1751 USA
V53655	Scott Aviation Lancaster, NY 14086-9502 USA



REGULATOR ASSEMBLY				CYLINDER FINISH (PAINT) Note 3	CYLINDER ASSEMBLY			
	CALL OUT	REGULATOR P/N	NOTE No.			CALL OUT	CAPACITY (ft^3)	CYLINDER ASSEMBLY P/N
TOGGLE	AT	803946-01	1	GREEN = 0	COMPOSITE	C22	22.8	804047-01
	BT	803946-02	1			C40	40.0	804047-05
	CT	804034-01	2			C50	50.1	804047-02
	DT	804034-02	2			C77	77.1	804047-03
	ET	(SUPSD by HT)				C15	115.7	804047-04
	FT	803946-04	1					
	GT	803946-05	1		STEEL	S22	22.0	804048-01
	HT	803946-03 (SUPSD by KT)	1			S39	39.4	804048-02
	JT	803946-06	1			S49	49.8	804048-03
	KT	803946-07	1			S66	66.0	804048-04
LEVER	AL	803980-01	1			S76	76.5	804048-05
	BL	803980-02	1			S15	115.0	804048-06
	CL	804035-01	2					
	DL	804035-02	2					

Note 1: Mates only w/ Composite Cylinder
Note 2: Mates only w/ Steel Cylinder
Note 3: Composite Cylinder = Green #14187 per FED STD-595
Steel Cylinder = Green #24062 per FED STD-595

CRA Part Number Configuration Matrix
Figure 1001

1. Introduction (Continued)

E. List of Abbreviations:

Abbreviations used in this section of the manual may be found in the List of Abbreviations (Paragraph 4.) of the INTRODUCTION section of this manual.

F. Numerical Index:

The following is a Numerical Index for this section:

PART NUMBER	AIRLINE STOCK No.	FIGURE	ITEM	TTL REQ'D
AN565BC1032H4		2	215	2
AN6289J3		2	415	1
AN960B6		2	180	1
MS16633-4031		2	225	1
MS21083N08		2	-375	2
MS21913J3		2	420	1
MS24677-12		2	245	4
MS27183-5		2	175	1
MS27183-8		2	200	1
MS28773-03		2	410	1
MS35206-241		2	-380	2
MS35275-226		2	170	2
MS51957-17		2	140	4
MS51957-41		2	235	1
MS9385-03		2	405	1
10006648		2	445	1
10007316		3	15	AR
10008247		2	265	1
10008248		2	300	1
10008249		2	295	1
10008250		2	290	1
10008251		2	305	1
10008252		2	260	1
10008254		2	350	1
10008255		2	345	1
10008257		2	310	1
10008258		2	280	1
10008259		2	340	1
10008260		2	275	1
10008262		2	250	1
10008272		2	205	1
10008273		2	185	2

PART NUMBER	AIRLINE STOCK No.	FIGURE	ITEM	TTL REQ'D
10008275		2	230	1
10008276		2	155	1
10008277		2	145	1
10008278		2	150	1
10008281		2	50	1
10008294		2	315	1
10008314		2	160	1
10008378		2	-360A	1
10008379		2	10	2
10008381		2	30	1
		2	-40A	1
10008393		2	20	1
10008435		2	55	1
10008436		2	450	1
10008437		2	455	1
10008438		2	440	1
10008439		2	435	1
10008459		3	40	1
10008462		3	30	1
10008485		2	190	1
10008494		2	5	1
10008756		2	400	1
10008789		2	385	1
10009010		2	130	1
10009314		1	50	1
10009321		2	-30A	1
10009322		2	-30B	1
10009342		2	370	1
10009343		2	390	1
10009431		2	-425	1
10009507		2	360	1
10009508		3	50	1
10009509		2	40	1
10009510		2	-45	1
10009780		2	470	1
10009813		2	20A	1
12362-00		2	-90	1
		2	-110	1
12362-01		2	80	1
		2	100	1
		2	100A	1
		2	100B	1

PART NUMBER	AIRLINE STOCK No.	FIGURE	ITEM	TTL REQ'D
18091-00		2	405	1
2-008L1218-80		2	270	1
2-011L1218-80		2	320	1
		2	355	1
21507-01		3	10	1
21507-02		3	-10A	1
21507-03		3	-10B	1
21507-04		3	-10C	1
21507-05		3	-10D	1
26738-01		2	255	AR
26738-02		2	-255A	AR
26894-01		2	125	1
2800B3A		2	405	1
3-903L1218-80		2	15	1
3-904L1218-80		2	25	1
		2	35	1
31062-022		1	60	2
31062-050		1	-60A	2
31062-077		1	-60B	2
31062-115		1	-60C	2
33321-241		2	-380	2
33324-017		2	140	4
33324-041		2	235	1
33331-226		2	170	2
33340-012		2	245	4
33350-041		2	215	2
33450-005		2	175	1
33450-008		2	200	1
33451-206		2	180	1
33479-003		2	-375	2
33528-601		2	115	1
33528-901		2	115A	1
5043-14		2	65	1
50740-02		2	270	1
50740-03		2	320	1
		2	355	1
50740-04		2	15	1
50740-05		2	25	1
		2	35	1

PART NUMBER	AIRLINE STOCK No.	FIGURE	ITEM	TTL REQ'D
57524-00		2	-85	1
		2	-430	1
		2	465	1
59776-00		2	395	1
59776-01		2	365	1
59819-01		2	195	1
6350A4XA		3	-20	1
6350A4-X-A		3	-20	1
6350A22XA		3	-20A	1
6350A22-X-A		3	-20A	1
6350A25XA		3	-20B	1
6350A25-X-A		3	-20B	1
6350A27XA		3	-20C	1
6350A27-X-A		3	-20C	1
6350A33XA		3	-20D	1
6350A33-X-A		3	-20D	1
6350A34XA		3	-20E	1
6350A34-X-A		3	-20E	1
6364-00		2	-55A	1
6370-00		2	60	1
800216-01		2	-460	1
802821-11		2	120	1
803283-01		2	-65A	1
803946-01		1	20	AR
		2	-1D	RF
803946-02		1	-20A	AR
		2	-1E	RF
803946-03		1	-20B	AR
		2	-1F	RF
803946-04		1	-20C	AR
		2	-1G	RF
803946-05		1	-20D	AR
		2	-1H	RF
803946-06		1	-20G	AR
		2	-1L	RF
803946-07		1	-20H	AR
		2	-1M	RF
803947-01		2	240	1
803948-01		2	-330	1
803948-02		2	-330A	1

PART NUMBER	AIRLINE STOCK No.	FIGURE	ITEM	TTL REQ'D
803949-01		2	-285	1
803973-01		2	-135	1
803974-01		2	-165	1
803975-01		2	-210	1
803980-01		-1	10	AR
		2	1	RF
803980-02		1	-10A	AR
		2	-1A	RF
803981-01		2	220	1
804006-01		2	325	1
804034-01		1	-20E	AR
		2	-1J	RF
804034-02		1	-20F	AR
		2	-1K	RF
804035-01		1	-10B	AR
		2	-1B	RF
804035-02		1	-10C	AR
		2	-1C	RF
804047-01		1	30	AR
		3	1	AR
804047-02		1	-30A	AR
		3	-1A	AR
804047-03		1	-30B	AR
		3	-1B	AR
804047-04		1	-30C	AR
		3	-1C	AR
804047-05		1	-30D	AR
		3	-1D	AR
804048-01		1	-40	AR
		3	-2	AR
804048-02		1	-40A	AR
		3	-2A	AR
804048-03		1	-40B	AR
		3	-2B	AR
804048-04		1	-40C	AR
		3	-2C	AR
804048-05		1	-40D	AR
		3	-2D	AR
804048-06		1	-40E	AR
		3	-2E	AR
804456-01		2	335	1
804572-01		2	-420A	1

PART NUMBER	AIRLINE STOCK No.	FIGURE	ITEM	TTL REQ'D
804889-02		2	75	1
8820-10		2	-70	1
898SERIES		1	1	RF

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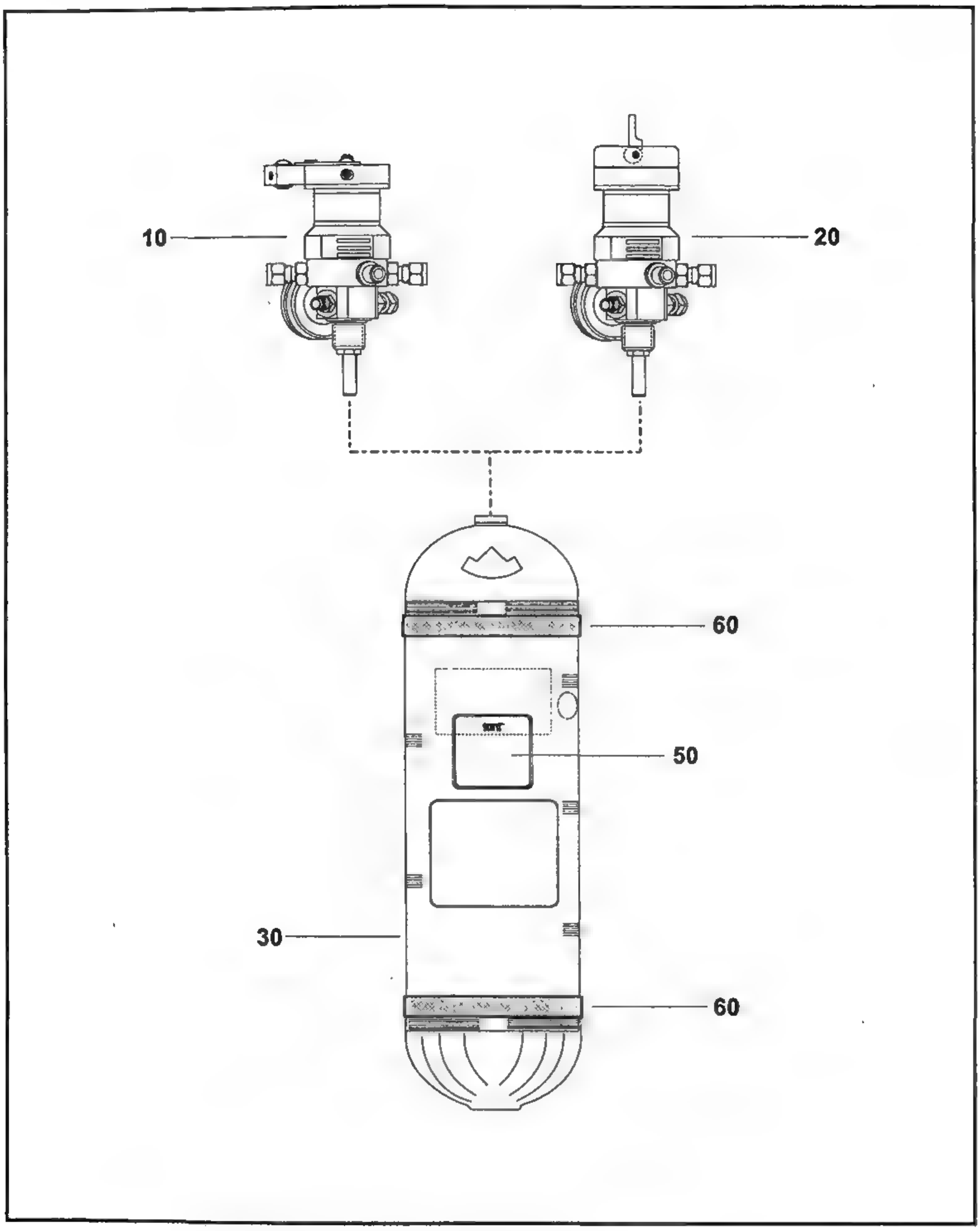

Cylinder and Regulator Assembly
Figure 1

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	**	EFF. CODE	UNITS PER ASSY
1-1	898SERIES		CYLINDER & REGULATOR ASSY SERIES (SPN 898 SERIES)	*	A	RF
10	803980-01		• REGULATOR ASSY - LEVER (REFER TO FIG 2 FOR BKDN)	AL		AR
-10A	803980-02		• REGULATOR ASSY - LEVER (REFER TO FIG 2 FOR BKDN)	BL		AR
-10B	804035-01		• REGULATOR ASSY - LEVER (REFER TO FIG 2 FOR BKDN)	CL		AR
-10C	804035-02		• REGULATOR ASSY - LEVER (REFER TO FIG 2 FOR BKDN)	DL		AR
20	803946-01		• REGULATOR ASSY - TOGGLE (REFER TO FIG 2 FOR BKDN)	AT		AR
-20A	803946-02		• REGULATOR ASSY - TOGGLE (REFER TO FIG 2 FOR BKDN)	BT		AR
-20B	803946-03		• REGULATOR ASSY - TOGGLE (SUPSD BY ITEM -20H) (REFER TO FIG 2 FOR BKDN)	HT		AR
-20C	803946-04		• REGULATOR ASSY - TOGGLE (REFER TO FIG 2 FOR BKDN)	FT		AR
-20D	803946-05		• REGULATOR ASSY - TOGGLE (REFER TO FIG 2 FOR BKDN)	GT		AR
-20E	804034-01		• REGULATOR ASSY - TOGGLE (REFER TO FIG 2 FOR BKDN)	CT		AR
-20F	804034-02		• REGULATOR ASSY - TOGGLE (REFER TO FIG 2 FOR BKDN)	DT		AR
-20G	803946-06		• REGULATOR ASSY - TOGGLE (REFER TO FIG 2 FOR BKDN)	JT		AR
-20H	803946-07		• REGULATOR ASSY - TOGGLE (SUPSDS ITEM -20B) (REFER TO FIG 2 FOR BKDN)	KT		AR
30	804047-01		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	C22		AR
-30A	804047-02		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	C50		AR
-30B	804047-03		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	C77		AR
-30C	804047-04		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	C15		AR
-30D	804047-05		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	C40		AR

* This P/N is not procurable (NP), however, refer to Figure 1001 (Part Number Configuration Matrix) to build a complete P/N that is procurable. A complete P/N provides information about the type of regulator assembly, cylinder finish, and the type of cylinder.

** The codes listed are the Call Out Codes in Figure 1001 (Part Number Configuration Matrix) and correspond to the Part Number for this item.

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	**	EFF. CODE	UNITS PER ASSY
1 -40	804048-01		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	S22		AR
-40A	804048-02		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	S39		AR
-40B	804048-03		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	S49		AR
-40C	804048-04		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	S66		AR
-40D	804048-05		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	S76		AR
-40E	804048-06		• CYLINDER ASSY (REFER TO FIG 3 FOR BKDN)	S15		AR
50	10009314		• PLATE, IDENTIFICATION			1
60	31062-022		• BAND, PROTECTIVE (USED W/ C22 CALLOUT FROM FIGURE 1001)			2
-60A	31062-050		• BAND, PROTECTIVE (USED W/ C40 and C50 CALLOUT FROM FIGURE 1001)			2
-60B	31062-077		• BAND, PROTECTIVE (USED W/ C77 CALLOUT FROM FIGURE 1001)			2
-60C	31062-115		• BAND, PROTECTIVE (USED W/ C15 CALLOUT FROM FIGURE 1001)			2

* This P/N is not procurable (NP), however, refer to Figure 1001 (Part Number Configuration Matrix) to build a complete P/N that is procurable. A complete P/N provides information about the type of regulator assembly, cylinder finish, and the type of cylinder.

** The codes listed are the Call Out Codes in Figure 1001 (Part Number Configuration Matrix) and correspond to the Part Number for this item.

- ITEM NOT ILLUSTRATED

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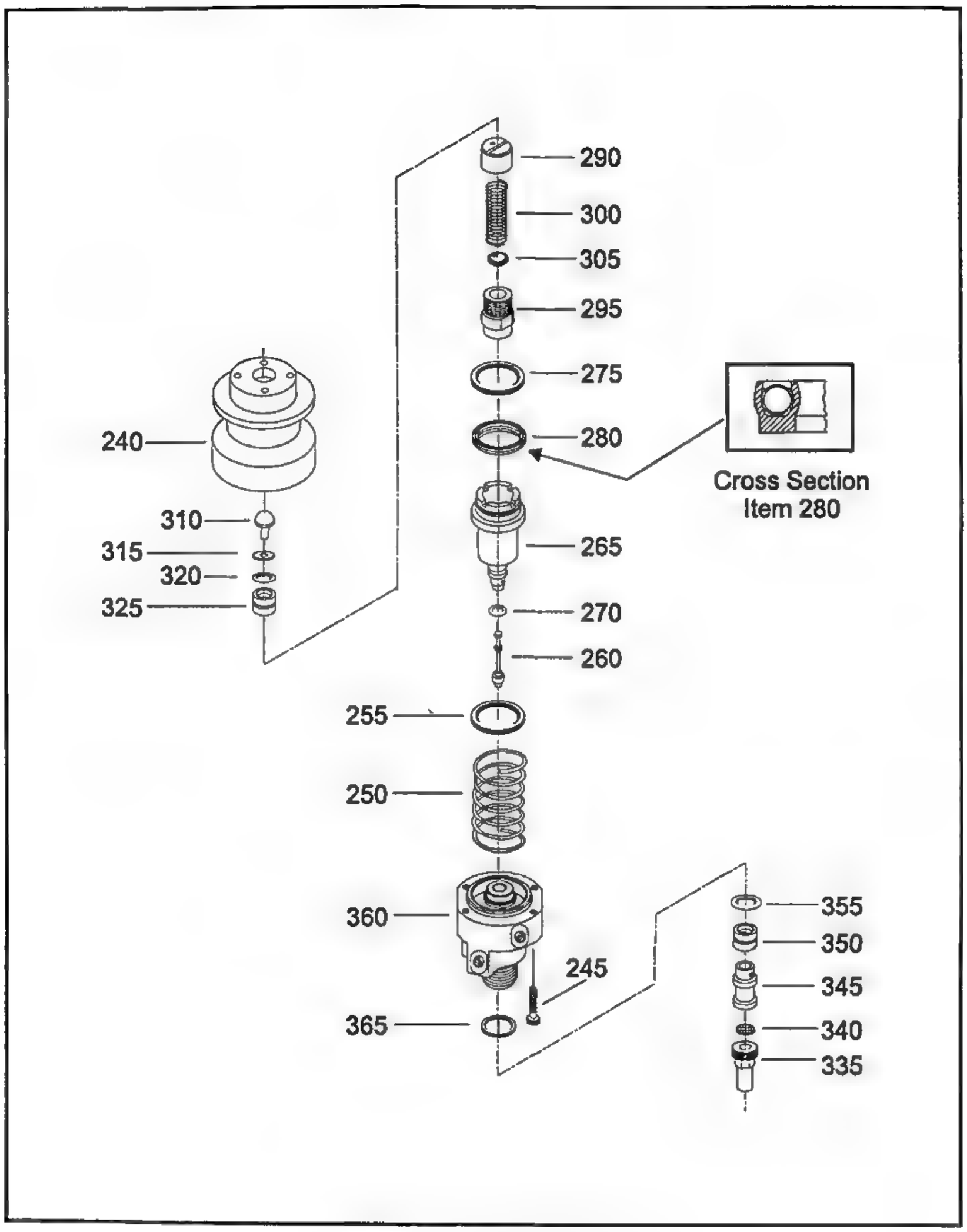
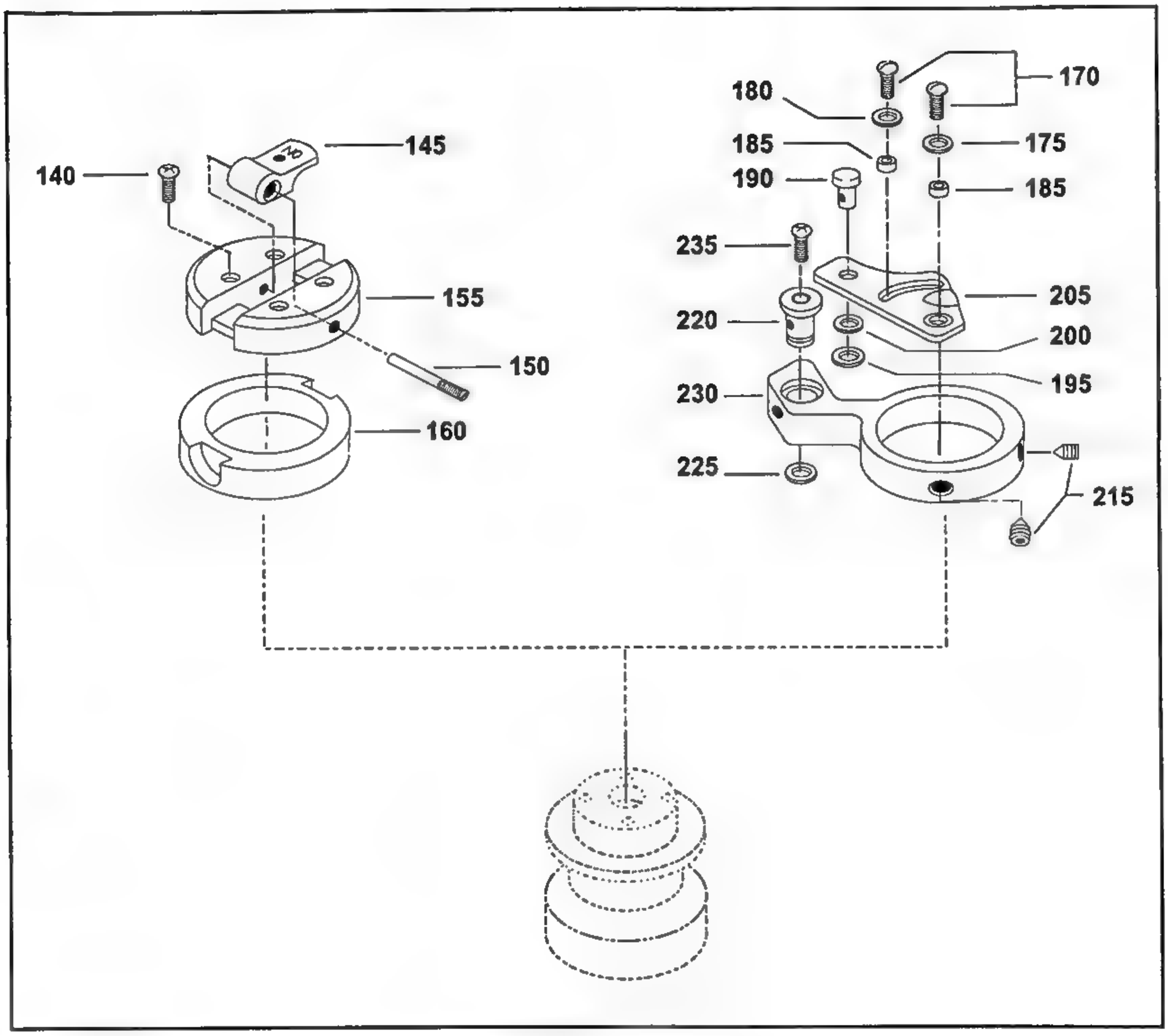
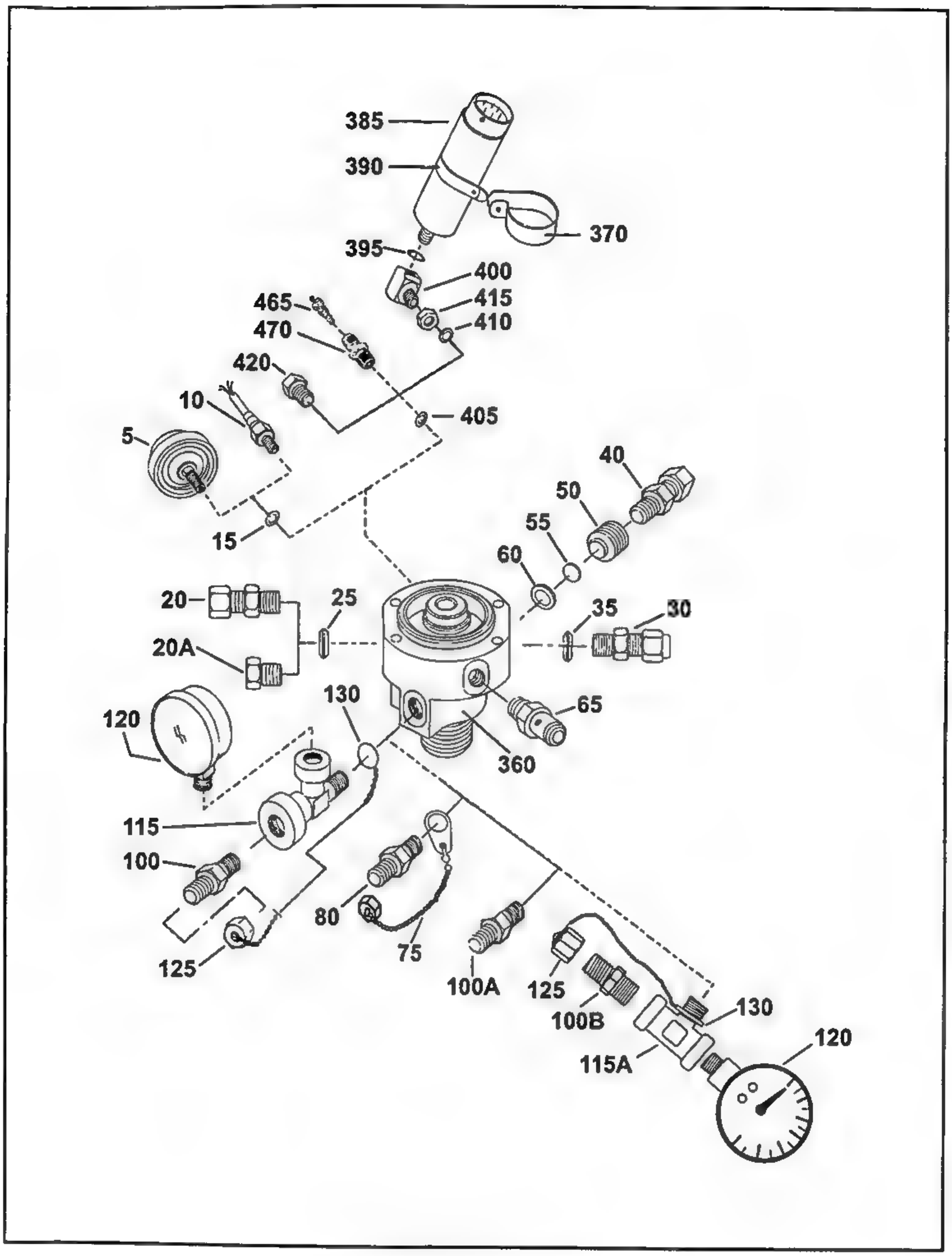


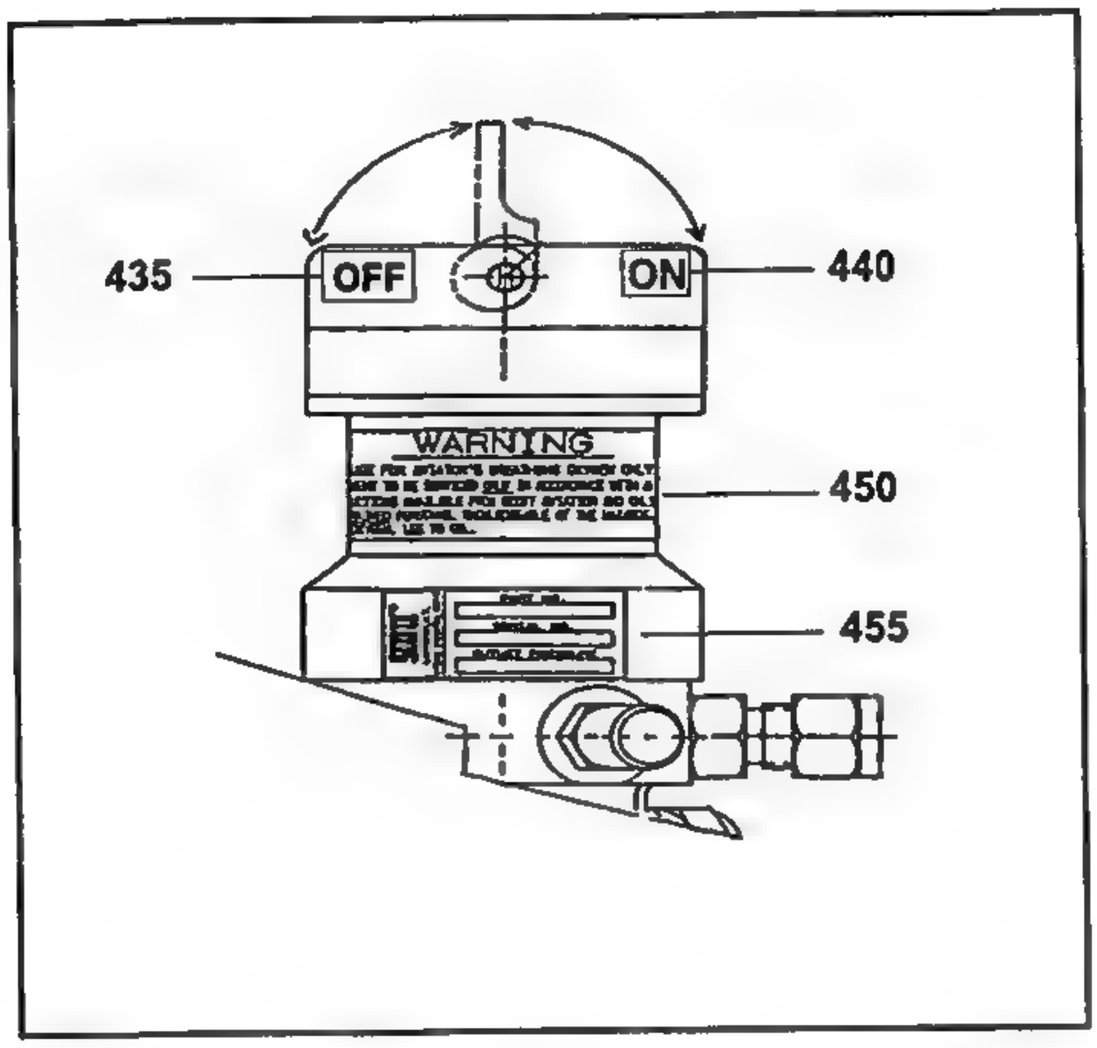
Regulator Assembly
Figure 2
(Sheet 1 of 4)



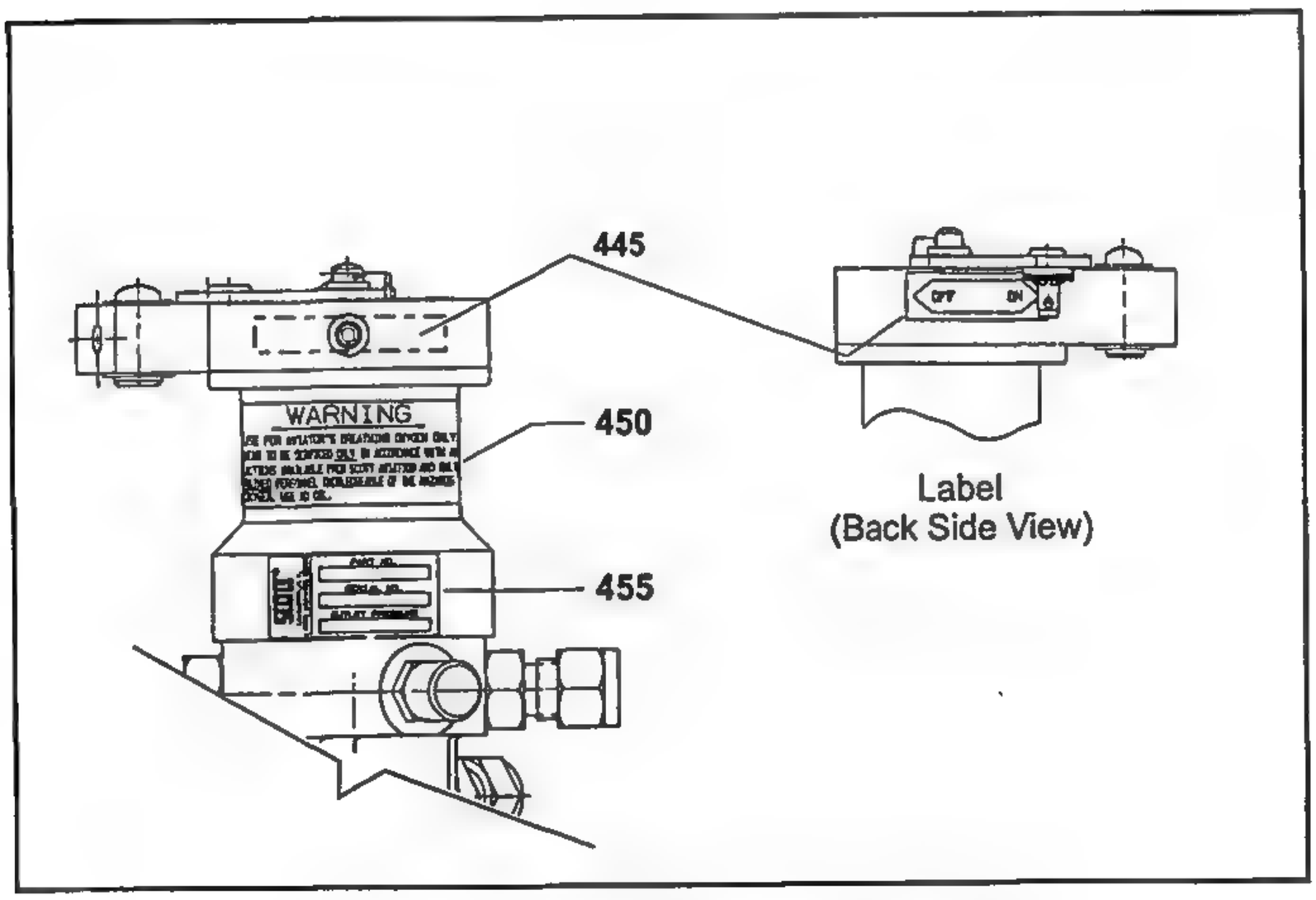
Regulator Assembly
Figure 2
(Sheet 2 of 4)



Regulator Assembly
Figure 2
(Sheet 3 of 4)



Toggle-Operated Regulator Labels
Figure 2
(Sheet 4A of 4)



Lever-Operated Regulator Labels
Figure 2
(Sheet 4B of 4)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
2-1	803980-01		REGULATOR ASSY - LEVER (REFER TO FIG 1 FOR NHA)	A	RF
-1A	803980-02		REGULATOR ASSY - LEVER (REFER TO FIG 1 FOR NHA)	B	RF
-1B	804035-01		REGULATOR ASSY - LEVER (REFER TO FIG 1 FOR NHA)	C	RF
-1C	804035-02		REGULATOR ASSY - LEVER (REFER TO FIG 1 FOR NHA)	D	RF
-1D	803946-01		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	E	RF
-1E	803946-02		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	F	RF
-1F	803946-03		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	G	RF
-1G	803946-04		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	H	RF
-1H	803946-05		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	J	RF
-1J	804034-01		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	K	RF
-1K	804034-02		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	L	RF
-1L	803946-06		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	M	RF
-1M	803946-07		REGULATOR ASSY - TOGGLE (REFER TO FIG 1 FOR NHA)	N	RF
5	10008494		• GAUGE, PRESSURE	A,C,E, K	1
10	10008379		• TRANSDUCER, PRESSURE	B,D,F,L	1
15	3-903L1218-80		• PACKING, PREFORMED (V02697) (SPN 50740-04)	A-H, K,L,N	1
20	10008393		• CONNECTOR, MALE	A-F, K,L	1
20A	10009813		• PLUG, FLARELESS TUBE	G-J, M,N	1
25	3-904L1218-80		• PACKING, PREFORMED (V02697) (SPN 50740-05)		1
30	10008381		• CONNECTOR, MALE ALTERED	A-F, K,L	1
-30A	10009321		• REDUCER, EXTERNAL THREAD	G,N	1
-30B	10009322		• REDUCER, EXTERNAL THREAD	H,J,M,	1
35	3-904L1218-80		• PACKING, PREFORMED (V02697) (SPN 50740-05)		1

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
2-40	10009509		• FITTING, ADAPTER	G -J, M,N	1
-40A	10008381		• CONNECTOR, MALE ALTERED	A-F, K,L	1
-45	10009510		• CATCHER, BURST DISC	G-J, M,N	1
50	10008281		• SPACER, BURST DISC		1
55	10008435		• DISC, SAFETY	A,B, E-J, M,N	1
-55A	6364-00		• DISC, SAFETY	C,D,K, L	1
60	6370-00		• WASHER, SAFETY PLUG		1
65	5043-14		• VALVE ASSY, PRESS RELIEF	A-H K,L,N	1
-65A	803283-01		• VALVE, RELIEF - OVERBOARD VENT	J,M	1
-70	8820-10		• SCREEN, FILTER		1
75	804889-02		• CAP ASSY, FILLER VALVE	H	1
80	12362-01		• VALVE ASSY, FILLER	H	1
-85	57524-00		• • CORE, VALVE	H	1
-90	12362-00		• • BODY	H	1
95			ITEM NO. 95 SKIPPED		
100	12362-01		• VALVE ASSY, FILLER	G,J,M	1
100A	12362-01		• VALVE ASSY, FILLER	A-F, K,L	1
100B	12362-01		• VALVE ASSY, FILLER	N	1
-105	57524-00		• • CORE, VALVE	A-G, J-N	1
-110	12362-00		• • BODY	A-G, J-N	1
115	33528-601		• FITTING, PIPE	G,J,M	1
115A	33528-901		• FITTING, BRANCH TEE	N	1
120	802821-11		• GAUGE, PRESSURE	G,J,M, N	1
125	26894-01		• CAP ASSY, W/ CHAIN (4 in. (10.2 cm) LENGTH)	G,J,M, N	1
130	10009010		• RING	G,J,M, N	1
-135	803973-01		• TOGGLE ASSY	E-N	1

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
2-			ATTACHING PARTS		
140	MS51957-17		• SCREW, PAN HEAD (CRES #4-40 X 0.50 in) (SPN 33324-017)	E-N	4
			***		
145	10008277		•• TOGGLE	E-N	1
			ATTACHING PARTS		
150	10008278		•• SHAFT, TOGGLE	E-N	1
			***		
155	10008276		•• HOUSING ASSY	E-N	1
160	10008314		• FILLER, TOGGLE	E-N	1
-165	803974-01		• LEVER ASSY	A-D	1
			ATTACHING PARTS		
170	MS35275-226		• SCREW - FILLISTER HEAD (CRES #6-32 X 0.25 in) (SPN 33331-226)	A-D	2
175	MS27183-5		• WASHER, FLAT (SPN 33450-005) (CAD PLATED STEEL 0.31 in OD X 0.16 in ID X 0.035in THICK)	A-D	1
180	AN960B6		• WASHER, FLAT (SPN 33451-206) (BRASS 0.38 in OD X 0.15 in ID X 0.032 in THICK)	A-D	1
185	10008273		• BUSHING, LEVER	A-D	2
			***		
190	10008485		•• PIN, STRAIGHT	A-D	1
			ATTACHING PARTS		
195	59819-01		•• RING, RETAINING	A-D	1
			***		
200	MS27183-8		•• WASHER, FLAT (SPN 33450-008) (CAD PLATED STEEL 0.44 in OD X 0.22 in ID X 0.049 in THICK)	A-D	1
205	10008272		•• LEVER	A-D	1
-210	803975-01		• BRACKET ASSY - HARNESS	A-D	1
			ATTACHING PARTS		
215	AN565BC1032H4		• SETSCREW, CONE POINT (CRES #10-32 X 0.25 in) (SPN 33350-041)	A-D	2
			***		
220	803981-01		•• INSERT ASSY	A-D	1
			ATTACHING PARTS		
225	MS16633-4031		•• RING, RETAINING	A-D	1
			***		

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
2-					
230	10008275		•• BRACKET, CABLE	A-D	1
235	MS51957-41		•• SCREW (CRES #8-32 X 0.25 in) (SPN 33324-041)	A-D	1
240	803947-01		• HOUSING ASSY		1
			ATTACHING PARTS		
245	MS24677-12		• SCREW, SOCKET HEAD CAP (CAD PLATED STEEL) (#6-32 X 1.00 in) (SPN 33340-012)		4
			•••		
250	10008262		• SPRING, REF. FORCE		1
255	26738-01		• SHIM, BRASS (0.84 in ID X 1.20 in OD X 0.01 in THICK)		AR
-255A	26738-02		• SHIM, BRASS (0.84 in ID X 1.20 in OD X 0.02 in THICK)		AR
260	10008252		• POPPET		1
265	10008247		• PISTON, REGULATING		1
270	2-008L1218-80		• PACKING, PREFORMED (V02697) (SPN 50740-02)		1
275	10008260		• RING, RETAINING		1
280	10008258		• SEAL, PISTON		1
-285	803949-01		• SPRING ASSY		1
290	10008250		•• CAP		1
295	10008249		•• RETAINER		1
300	10008248		•• SPRING		1
305	10008251		•• DISC		1
310	10008257		• PIN, ACTUATION		1
315	10008294		• SHIM, ACTUATION PIN		1
320	2-011L1218-80		• PACKING, PREFORMED (V02697) (SPN 50740-03)		1
325	804006-01		• HOUSING ASSY, SEAL		1
-330	803948-01		• BODY ASSY	A,B, E-J, M,N	1
-330A	803948-02		• BODY ASSY	C,D, K,L	1
335	804456-01		•• TUBE ASSY		1
340	10008259		•• FILTER		1
345	10008255		•• SPACER		1
350	10008254		•• SEAT		1

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
2-355	2-011L1218-80		•• PACKING, PREFORMED (V02697) (SPN 50740-03)		1
360	10009507		•• BODY, REGULATOR	A,B, E-J, M,N	1
-360A	10008378		•• BODY, REGULATOR	C,D, K,L	1
365	59776-01		• SEAL, METAL BOSS	A,B, E-J, M,N	1
370	10009342		• CLAMP, REGULATOR	G,N	1
			ATTACHING PARTS		
-375	MS21083N08		• NUT, SELF-LOCKING (STEEL #8-32) (SPN 33479-003)	G,N	2
-380	MS35206-241		• SCREW, PAN HEAD (CAD PLATED STEEL) #8-32 X 0.25 in) (SPN 33321-241)	G,N	2
			***		
385	10008789		• TRANSDUCER, TEMP/ PRESSURE	G,N	1
390	10009343		• CLAMP, TRANSDUCER	G,N	1
395	59776-00		• SEAL, METAL BOSS	G,N	1
400	10008756		• ELBOW, MALE/FEMALE 90°	G,N	1
405	MS9385-03		• PACKING, PREFORMED (SPN 2800B3A) OR (ALTERNATE SPN 18091-00)	G-J, M,N	1
410	MS28773-03		• RETAINER, PACKING BACKUP	G,N	1
415	AN6289J3		• NUT, TUBE	G,N	1
420	MS21913J3		• PLUG, FLARELESS TUBE	H	1
-420A	804572-01		• VALVE ASSY, FILLER	J	1
-425	10009431		•• BODY, VALVE	J	1
-430	57524-00		•• CORE, VALVE	J	1
435	10008439		• LABEL, OFF	E-N	1
440	10008438		• LABEL, ON	E-N	1
445	10006648		• LABEL, PUSH-PULL	A-D	1
450	10008436		• LABEL, WARNING		1
455	10008437		• PLATE, IDENTIFICATION		1
-460	800216-01		• VALVE ASSY, CHARGING	M	1
465	57524-00		•• CORE, VALVE	M	1
470	10009780		•• BODY, VALVE	M	1

- ITEM NOT ILLUSTRATED

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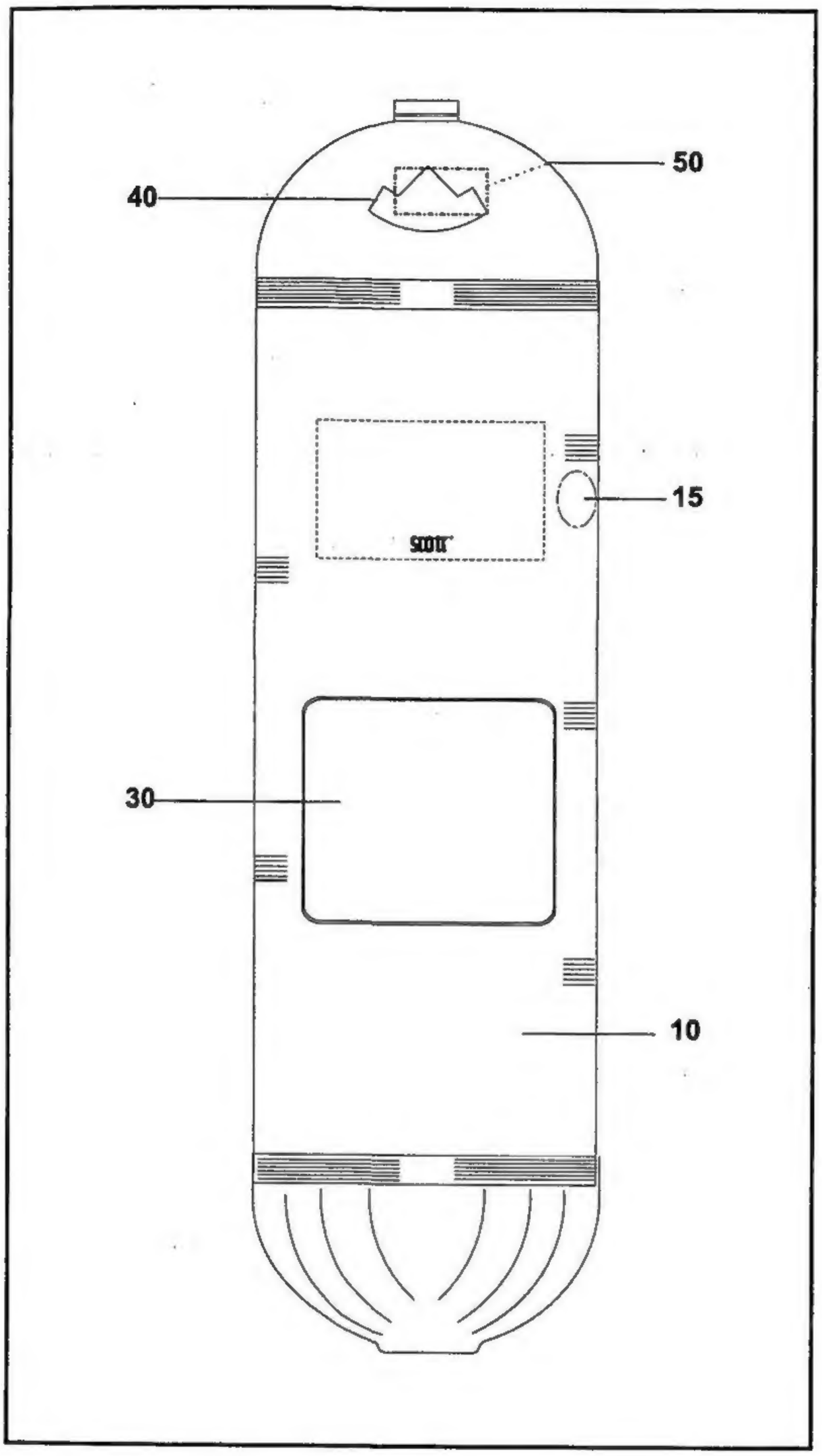

Cylinder Assembly
Figure 3

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
3-1	804047-01		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	A	RF
-1A	804047-02		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	B	RF
-1B	804047-03		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	C	RF
-1C	804047-04		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	D	RF
-1D	804047-05		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	E	RF
-2	804048-01		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	F	RF
-2A	804048-02		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	G	RF
-2B	804048-03		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	H	RF
-2C	804048-04		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	J	RF
-2D	804048-05		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	K	RF
-2E	804048-06		CYLINDER ASSY (REFER TO FIG. 1 FOR NHA)	L	RF
10	21507-01		• CYLINDER, COMPOSITE	A	1
-10A	21507-02		• CYLINDER, COMPOSITE	B	1
-10B	21507-03		• CYLINDER, COMPOSITE	C	1
-10C	21507-04		• CYLINDER, COMPOSITE	D	1
-10D	21507-05		• CYLINDER, COMPOSITE	E	1
15	10007316		•• LABEL, HYDRO-RETEST	A-E	† AR
-20	6350A4XA		• CYLINDER, STEEL (SPN 6350A4-X-A)	F	1
-20A	6350A22XA		• CYLINDER, STEEL (SPN 6350A22-X-A)	G	1
-20B	6350A25XA		• CYLINDER, STEEL (SPN 6350A25-X-A)	H	1
-20C	6350A27XA		• CYLINDER, STEEL (SPN 6350A27-X-A)	J	1
-20D	6350A33XA		• CYLINDER, STEEL (SPN 6350A33-X-A)	K	1
-20E	6350A34XA		• CYLINDER, STEEL (SPN 6350A34-X-A)	L	1

† Note: Prior Hydro-Retest Labels must remain on the Cylinder Assy (items 1 thru -1D).

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF. CODE	UNITS PER ASSY
3-					
30	10008462		• LABEL, WARNING		1
40	10008459		• LABEL, WARNING	A-E	1
50	10009508		• LABEL, WARNING	A-E	1

- ITEM NOT ILLUSTRATED